

ENTRIES 4718-5283

BOTANICAL ABSTRACTS

PUBLISHED MONTHLY UNDER THE DIRECTION OF
THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

THE SOCIETIES NOW REPRESENTED,

AND

THE MEMBERS OF THE BOARD OF CONTROL

(The Members of the Executive Committee for 1923 are indicated by asterisks)

American Association for the Advancement of Science, Section G.

*R. A. HARPER, Columbia University, New York City.

L. L. BURLINGAME, Leland Stanford University, Stanford University, California.

Botanical Society of America, General Section.

H. A. GLEASON, New York Botanical Garden, New York City.

Botanical Society of America, Physiological Section.

*OTIS F. CURTIS (*Secretary of the Board*), Cornell University, Ithaca, New York.

Botanical Society of America, Systematic Section.

MARSHALL A. HOWE, New York Botanical Garden, New York City.

Botanical Society of America, Mycological Section.

C. H. KAUFFMAN, University of Michigan, Ann Arbor, Michigan.

American Society of Naturalists.

*H. H. BARTLETT (*Chairman of the Board*), University of Michigan, Ann Arbor, Michigan.

G. R. LYMAN, West Virginia University, Morgantown, West Virginia.

American Society of Zoologists and Botanical Society of America, Joint Genetics Sections.

SEWALL WRIGHT, U. S. Bureau of Animal Industry, Washington, D. C.

Ecological Society of America.

H. L. SHANTZ, U. S. Bureau of Plant Industry, Washington, D. C.

H. C. COWLES, University of Chicago, Chicago, Illinois.

Paleontological Society of America.

ARTHUR HOLLICK, 61 Wall Street, New Brighton, New York.

G. R. WIELAND, Yale University, New Haven, Connecticut.

American Society of Agronomy.

C. B. HUTCHISON, University of California, Davis, California.

H. K. HAYES, University of Minnesota, University Farm, St. Paul, Minnesota.

American Society for Horticultural Science.

V. R. GARDNER, Michigan Agricultural College, East Lansing, Michigan.

J. W. BUSHNELL, University of Minnesota, University Farm, St. Paul, Minnesota.

American Phytopathological Society.

*L. R. JONES, University of Wisconsin, Madison, Wisconsin.

E. C. STAKMAN, University of Minnesota, University Farm, St. Paul, Minnesota.

Society of American Foresters.

*RAPHAEL ZON, U. S. Forest Service, Washington, D. C.

E. P. MEINECKE, U. S. Forest Service, Ferry Building, San Francisco, California.

American Conference of Pharmaceutical Faculties.

HEBER W. YOUNGKEN, Massachusetts College of Pharmacy, Boston, Massachusetts.

E. N. GATHERCOAL, 701 S. Wood Street, Chicago, Illinois.

Canadian Society of Technical Agriculturists.

W. P. THOMPSON, University of Saskatchewan, Saskatoon, Saskatchewan.

B. T. DICKSON, Macdonald College, Macdonald College, Quebec.

Royal Society of Canada.

F. E. LLOYD, McGill University, Montreal, Quebec.

J. H. FAULL, University of Toronto, Toronto, Ontario.

At Large

J. I. LAURITZEN, U. S. Bureau of Plant Industry, Washington, D. C.

J. R. SCHRAMM (*ex officio*), National Research Council, Washington, D. C.

Published for the Owners,

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.,

by

WILLIAMS & WILKINS COMPANY

BALTIMORE, U. S. A.

Entered as second-class matter, November 9, 1918, at the post office at Baltimore, Maryland, under the Act of March 3, 1879

Copyright, 1923, Williams & Wilkins Company

FOR EDITORIAL AND BUSINESS NOTICES, SEE THIRD COVER PAGE

CONTENTS

Agronomy.....	4718-4755
Bibliography, Biography and History.....	4756-4781
Botanical Education.....	4782-4802
Cytology.....	4803-4849
Ecology.....	4850-4904
Forest Botany and Forestry.....	p. 814
Genetics.....	4905-4993
Horticulture.....	4994-5028
Morphology, Anatomy and Histology of Vascular Plants.....	5029-5040
Morphology and Taxonomy of Algae.....	p. 838
Morphology and Taxonomy of Bryophytes.....	5041-5048
Morphology and Taxonomy of Fungi, Lichens, Bacteria and Myxomycetes.....	5049-5100
Paleobotany and Evolutionary History.....	5101-5115
Pathology.....	5116-5144
Pharmaceutical Botany and Pharmacognosy.....	5145-5166
Physiology.....	5167-5257
Soil Science.....	5258-5273
Taxonomy of Vascular Plants.....	p. 879
Miscellaneous, Unclassified Publications.....	5274-5283

BOARD OF EDITORS FOR 1923 AND ASSISTANT EDITORS

Editor-in-Chief, J. R. SCHRAMM
National Research Council, Washington, D. C.

EDITORS FOR SECTIONS

- | | |
|---|--|
| <p>Agronomy. C. V. PIPER, U. S. Bureau of Plant Industry, Washington, D. C.—Assistant Editor, MARY R. BURR, U. S. Bureau of Plant Industry, Washington, D. C.</p> <p>Bibliography, Biography and History. CARROLL W. DODGE, Harvard University, Cambridge, Massachusetts. Assistant Editor, CHARLES A. WEATHERBY, 11 Wells Avenue, East Hartford, Connecticut.</p> <p>Botanical Education. C. STUART GAGER, Brooklyn Botanic Garden, Brooklyn, New York.—Assistant Editor, ARTHUR H. GRAVES, Brooklyn Botanic Garden, Brooklyn, New York.</p> <p>Cytology. GILBERT M. SMITH, University of Wisconsin, Madison, Wisconsin.</p> <p>Ecology and Plant Geography. GEO. D. FULLER, The University of Chicago, Chicago, Illinois.</p> <p>Forest Botany and Forestry. W. N. SPARHAWK, U. S. Forest Service, Washington, D. C.</p> <p>Genetics. ORLAND E. WHITE, Brooklyn Botanic Garden, Brooklyn, New York.</p> <p>Horticulture. J. H. GOURLEY, Ohio Agricultural Experiment Station, Wooster, Ohio.</p> <p>Miscellaneous, Unclassified Publications. BURTON E. LIVINGSTON, The Johns Hopkins University, Baltimore, Maryland.—Assistant Editor, SAM F. TRELEASE, The Johns Hopkins University, Baltimore, Maryland.</p> <p>Morphology, Anatomy and Histology of Vascular Plants. E. W. SINNOTT, Connecticut Agricultural College, Storrs, Connecticut.</p> | <p>Morphology and Taxonomy of Algae. E. N. TRANSEAT, Ohio State University, Columbus, Ohio.—Assistant Editor, L. H. TIFFANY, Ohio State University, Columbus, Ohio.</p> <p>Morphology and Taxonomy of Bryophytes. ALEXANDER W. EVANS, Yale University, New Haven, Connecticut.</p> <p>Morphology and Taxonomy of Fungi, Lichens, Bacteria and Myxomycetes. H. M. FITZPATRICK, Cornell University, Ithaca, New York.—Assistant Editor, DONALD S. WELCH, Cornell University, Ithaca, New York.</p> <p>Paleobotany and Evolutionary History. EDWARD W. BERRY, The Johns Hopkins University, Baltimore, Maryland.</p> <p>Pathology. FREDERICK V. RAND, Bureau of Plant Industry, Washington, D. C.—Assistant Editor, LILLIAN C. CASH, Bureau of Plant Industry, Washington, D. C.</p> <p>Pharmaceutical Botany and Pharmacognosy. HEBER W. YOUNGKEN, Massachusetts College of Pharmacy, Boston, Massachusetts.—Assistant Editor F. N. GATHERCOAL, 701 South Wood St., Chicago, Illinois.</p> <p>Physiology. B. M. DUGGAR, Missouri Botanical Garden, St. Louis, Missouri.—Assistant Editor, WILLIAM J. ROBBINS, University of Missouri, Columbia, Missouri.</p> <p>Soil Science. A. G. MCCALL, University of Maryland, College Park, Maryland.</p> <p>Taxonomy of Vascular Plants. J. M. GREENMAN, Missouri Botanical Garden, St. Louis, Missouri.—Assistant Editor, E. B. PAYSON, University of Wyoming, Laramie, Wyoming.</p> |
|---|--|

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief
National Research Council, Washington, D. C.

Vol. 12

SEPTEMBER, 1923

No. 7

ENTRIES 4718-5283

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 4790, 4801, 4878, 4886, 4892, 4907, 4932, 4960, 4990, 5118, 5121, 5126, 5179, 5203, 5240, 5260, 5268, 5270, 5271)

4718. ANONYMOUS. A classification and detailed description of oats of Australia. Inst. Sci. and Indust. Australia Bull. 23. 31 p., 4 pl., 4 (col.) fig. 1922.—Australian grown oats of 3 species, *Avena sativa*, *A. orientalis*, and *A. sterilis*, are classed in 27 agricultural varieties and an identification key is presented. The botanical and agricultural characters used in classification are discussed in detail. Of the varieties, 6 were produced by breeding in Australia.—*L. R. Waldron*.

4719. ANONYMOUS. A classification and detailed description of the barleys of Australia. Inst. Sci. and Indust. Australia Bull. 22. 33 p., 1 pl., 4 fig. 1922.—Australian-grown barleys of 4 botanical varieties are grouped into 7 classes, 15 types, and 35 agronomic varieties. The botanical and agricultural characters used in classification are discussed in detail.—*L. R. Waldron*.

4720. ANONYMOUS. Australian salt-bush in South Africa. Jour. Dept. Agric. Victoria 19: 635-636. 1921.—The characteristics of 7 species of Australian salt-bushes are briefly described and cultural methods for Australian conditions briefly discussed.—*H. L. Westover*.

4721. ANONYMOUS. Local trials with sunflowers as silage. Agric. Gaz. New South Wales 34: 158. 1923.—The silage was unpalatable due probably to its high acidity.—*L. R. Waldron*.

4722. ANONYMOUS. Sudan grass: *Andropogon sorghum sudanensis*. Jour. Dept. Agric. Victoria 19: 507-508. 1921.—This article describes the grass and discusses its culture, including climatic and soil conditions, seed-bed preparation, time and methods of sowing, fertilizers, pasturing, and harvesting. Among the fertilizers tested Sudan grass responded very readily to superphosphate, 100 pounds per acre giving an increase of 73 per cent in yield above the unmanured check plot.—*H. N. Vinall*.

4723. ANONYMOUS. The cultivation of maize. Jour. Dept. Agric. Victoria 19: 668-676. 4 fig. 1921.—The essentials of maize culture are considered, including such topics as varieties, rotations, preparation of seed bed, rate, date and method of planting, fertilizers, cultivating, harvesting and selecting, testing, and caring for the seed.—*F. D. Richey*.

4724. ANONYMOUS. Undersogelser over Landbrugets Driftsforhold Regnskabsresultater fra Danske Landbrug. [Examination of results of agricultural experiments.] Tidsskr. Landokonomi 1923: 74-87. 1923.—The different soil characteristics in North and South Jutland, the Island of Zealand and other Danish islands including Bornholm in the Baltic Sea, are discussed.—*Albert A. Hansen*.

4725. BARTLETT, H., and W. D. KERLE. Farmers' experiment plots. Wheat, oat and barley experiments, 1922. Agric. Gaz. New South Wales 34: 161-170. 1923.—Cooperative experiments were conducted upon 27 private farms. Tables show precipitation, cultural details, and yields. Federation, Hard Federation, and Canberra wheats gave satisfactory results. Plots receiving phosphatic fertilizers produced significantly greater yields in comparison with check plots.—*L. R. Waldron*.

4726. BECHDEL, S. I. Sunflower silage for milk production. Pennsylvania Agric. Exp. Sta. Bull. 172. 16 p. 1922.—Sunflower silage and corn silage are compared as to quantity of milk and butter fat produced and effect on the weight of dairy cows. It was found that sunflower silage contains about 4 per cent less dry matter than corn silage but is practically equal to the latter in all the principal food elements except nitrogen-free extract.—The results of 2 feeding tests with dairy cows indicated that (1) sunflower silage was less palatable than corn silage, (2) the cows produced only 86.4 per cent as much milk when fed sunflower silage as when fed corn silage, and (3) a silage $\frac{1}{2}$ sunflower and $\frac{1}{2}$ corn fed in normal amounts produced less than 92.6 per cent as much milk as a corn silage ration.—*H. N. Vinall*.

4727. BLAKELY, W. F. Weeds of New South Wales. Agric. Gaz. New South Wales 34: 181-185. 1 fig. 1923.—*Carduus arvensis* (Canada thistle) is reported for the 1st time in N. S. W. It is described and methods of control are suggested.—*L. R. Waldron*.

4728. BRACKEN, JOHN. Dry farming in western Canada. xvi + 386 p. The Grain Growers' Guide, Ltd.: Winnipeg, Canada, 1921.—This is a text book in 17 chapters dealing with the soil and its management under western conditions. It covers the development of dry farming; the climate of western Canada in its relation to crop production; the soil; the moisture problem; dry farm crops and cropping practices; the principles of tillage; breaking the virgin prairie; preparing park belt land for its first crop; tillage of stubble land; summer fallow; crop rotations; weeds and their control; irrigation farming in western Canada; causes and control of low yields; management of special soils; lessons from experience; and the problems of crop production. The chapter on soils was contributed by ROY HANSEN; the chapter on irrigation by W. H. FAIRFIELD; and the chapter on lessons from experience, by 10 of the leading agronomists of the Great Plains region of Canada and the U. S. A. The book "presents under one cover a more or less complete statement of our present knowledge concerning the methods of producing crops at a profit under relatively dry conditions."—*John S. Cole*.

4729. CALL, L. E. Increasing the efficiency of agronomic research. Jour. Amer. Soc. Agron. 14: 329-338. 1922.—Presidential address.—*F. M. Schertz*.

4730. CH[ÉVALIER], A. [Rev. of: ROUEST, (L.). Le soja et son lait végétal, applications agricoles et industrielles. (Agricultural and industrial applications of the soybean and soybean milk.) 8°, 157 p., 8 fig. Bibliothèque de technique agricole moderne: Paris, 1921.] Rev. Bot. Appl. et Agric. Coloniale 2: 34-37. 1922.—The reviewer believes that the new varieties of soybeans mentioned by the author as well fixed should not be so regarded until years of selection have made them constant. He agrees with the author that there should be a station established for the study of applied genetics in France, and also that the cultivation of the soybean should be extended throughout France and her colonies.—*Paul Russell*.

4731. CONNER, S. D. Use of muck soils for the production of general farm crops. Jour. Amer. Peat Soc. 16: 5-9. 1923.—In the U. S. A. there are some 15 million acres of swamp land, consisting largely of peaty soils. In Michigan and Indiana alone there are over 3 million acres of swamp land. Experiments have proved that practically all crops grown on other soils in the same locality can be grown on peat.—*Mary R. Burr.*

4732. DUCELLIER, L. Les pâturages due Maroc. Considérations générales sur l'amélioration de la production fourragère dans l'Afrique du Nord. [The pastures of Morocco. General considerations on the improvement in the production of forage in northern Africa.] 52 p. Imprimerie algérienne: Algeria, 1919. [Bibliothèque du colon du Nord de l'Afrique.]—In spite of the great importance of forage in Morocco, the pastures and hay fields of the country yield much less than would be the case if greater care were given them. Means suggested to increase the yields and the value of the forage include the prevention of the seeding and spreading of weeds, proper cultural care of the fields, better methods of harvesting hay, the growing of forage plants, and the domestication and cultivation of native plants of forage value. Lists are given of the grasses, legumes, and other plants growing in the fields of the various regions of Morocco, with notes on their relative importance as sources of forage.—*Jessie Wood.*

4733. GREENWOOD, F. W. Liming and manurial trials with rape at Martinsborough. New Zealand Jour. Agric. 24: 213-218. 1922.—Experiments were carried out to determine whether lime was beneficial to rape and whether uncrushed lime from the local deposit could be used as profitably as burnt lime or ground limestone, which was shipped in and cost on the land twice as much as the local lime. Another problem was the effect of the lime on certain phosphate fertilizers. The results showed that (1) lime yields beneficial results; (2) while the imported ground limestone acts more quickly the local screened limestone is more economical; (3) superphosphate and lime gave better results than superphosphate alone. All tests were made on rape.—*H. N. Vinall.*

4734. HARTWELL, BURT L. Liming with high-magnesium versus high-calcium limes. Rhode Island Agric. Exp. Sta. Bull. 186. 19 p. 1921.—Results of field experiments from 1909 to 1920 are reported. In 1917, the ratio of magnesium oxide to calcium oxide in dried endive was, respectively, 1 to 1.1 and 1.5 with magnesian hydrate and limestone; whereas it was 1 to 2.2, 3.0, and 2.8 with calcic hydrate and limestone, and with no lime.—Certain sensitive crops have been benefited very much by the liming; the beet crop, for example, was frequently increased 6 fold. Even such sensitive crops, however, did not react to liming in such a way as to warrant generalizations concerning specific effects of the different kinds of lime.—As an example of the effect of crops on a following crop, on the unlimed soil, onions at the rate of 92 bushels were produced after sugar beets, 288 after beans, 319 after onions, and 400 after endive; whereas, on the adjoining limed plot, the range was only from 485 to 590 bushels.—In a mixture, the proportion of red clover and timothy was about twice as great on the limed areas as on the unlimed plot, whereas the reverse was true of the alsike clover and red top.—*B. L. Hartwell.*

4735. HARTWELL, BURT L., and F. R. PEMBER. The feeding power of certain cereals, and their response to fertilizer ingredients. Rhode Island Agric. Exp. Sta. Bull. 190. 27 p. 1922.—In the field was exhibited (1) a low response to nitrogen by spring rye, to phosphorus by buckwheat, oats, and millet, and to potassium by rye, oats, millet, and spring wheat; (2) a medium response to nitrogen by oats and wheat, to phosphorus by barley, rye, and wheat, and to potassium by barley and buckwheat; and (3) a high response to nitrogen by millet, buckwheat, and barley. Usually the conditions favored oats, buckwheat, and millet more than the other crops.—With liberal fertilizer each cereal grew somewhat better following wheat, barley, and oats than following rye, and also following buckwheat instead of millet. The growth of buckwheat was much depressed by a preceding crop of millet.—Feeding power of crops may depend more on their longevity, and on the fact that the most active growth occurs at different times, than to marked differences in ability to absorb nutrients during one definite period under a uniform set of soil conditions.—*B. L. Hartwell.*

4736. HOLLISTER, BERTHA A. The relation between the common weeds of Michigan and those found in commercial seed. Rept. Michigan Acad. Sci. 22: 187-188. 1920.—In general the relative frequency of weed seeds in samples of commercial seeds shows a close correlation to the abundance of the weeds in the state. This does not hold true for some weeds where such seeds are very easily and thoroughly cleaned out of the commercial seed by only moderate fanning, e.g., *Linaria linaria*, *Asclepias syriaca*, *Leontodon taraxacum*. On the other hand the pappus of *Cirsium arvense* is so easily detached from the akene that the latter remains with the crop seed and only the pappus is removed by the fanning. The origin of the seed may often be determined by the weed seeds present.—*Ernst A. Bessey*.

4737. HOPKINS, C. G. How Greece can produce more food. Illinois Agric. Exp. Sta. Bull. 239. 433-467. Fig. 1-15. 1922.—Cyril G. Hopkin's report on agricultural conditions existing in Greece and recommendation of some practical scientific methods for improving the conditions is reprinted as it was prepared by him for presentation to the people of Greece.—*O. H. Sears*.

4738. HOWELL, J. PRYSE. The productivity of hill farming, being the report of an inquiry in three typical districts. 23 p. Oxford University Press: London, 1922.—A study of the problems confronting parts of West Britain relating to improvement of breeds, destruction of goose heather and bracken, shelter belts, marketing, control of commons, drainage, and manuring and short rotations is reported.—*A. J. Pieters*.

4739. HOYER, JAMES. Det Kgl. danske Landhusholdningsselskabs Kontrol med Korn og Foderstoffer i Kobenshavns Frihavn i Aaret 1922. [The Royal Danish Agricultural Society's control with wheat and cattlefood in Copenhagen's free harbor during the year 1922.] Tidsskr. Landokonomi 3: 157-164. 1923.—The Royal Danish Agricultural Society maintains a "control and inspection" office at the famous Free Harbor of Copenhagen. The inspector here reports results for the year 1922.—*Albert A. Hansen*.

4740. HULBERT, H. W. Factors affecting the stand and yield of sweet clover. Jour. Amer. Soc. Agron. 15: 81-87. 1923.—Various methods of seeding sweet clover lead to the following conclusions: the higher the rate of seeding the greater the loss in stand. Where a nurse crop was used the reduction in stand was greatest. The lighter rates of seeding produced satisfactory yields, but the poorest was very coarse and stemmy. Peas made a more desirable nurse crop than any of the small grains. There was apparently no relation between the water requirement of the crop and its desirability from the standpoint of effect upon stand and yield of sweet clover.—*F. M. Schertz*.

4741. KERLE, W. D. Field wheat and fallowing competition. Eugowra P., A., and H. association. Agric. Gaz. New South Wales 34: 153-158. 1923.—Crops were scored on yield, freedom from disease, cleanliness, type, evenness and condition, with appropriate weighting. Flag smut and certain root-rot diseases are increasing in the district.—*L. R. Waldron*.

4742. McCULLOCH, W. J. Recent lucerne experience at Weraroa. New Zealand Jour. Agric. 25: 162-164. 1922.—A cultivation test to assist in maintaining a stand proved practically valueless. It is concluded that the amount of attention necessary to control the grass and clover renders the production of lucerne economically unsound. A mixture of permanent grasses and clover gave much more satisfactory results.—*H. L. Westover*.

4743. McFADZEAN, J. S. Mangels and maize for summer fodder. Jour. Dept. Agric. Victoria 19: 445-446. 1921.—The author discusses the importance of an abundance of fodder in dairy farming and the methods of soil preparation, planting, cultivating, and utilizing mangels and maize.—*F. D. Richey*.

4744. NOLL, CHARLES F. The effects of phosphates on early growth and maturity. Jour. Amer. Soc. Agron. 15: 87-99. 1923.—Data and observations on the effect of phosphate on early growth are summarized, with a few unpublished results secured on fertilizer plots at the Pennsylvania Experiment Station.—*F. M. Schertz.*

4745. PFEIFFER, TH. Die Möglichkeit eines teilweisen Ersatzes der Phosphorsäure durch Kieselsäure in den Pflanzen. [The possibility of a partial substitution of phosphoric acid by silicic acid in plants.] Mitteil. Deutsch. Landw. Ges. 38: 196-198. 1923.—This is a review of a paper by O. LEMMERMANN and H. WIESSMANN [Zeitschr. Pflanzenernährung und Düngung, Heft 5, 1922], who showed that when plants are well supplied with nitrogen and potash, silicic acid in addition to phosphoric acid increases the yield of grain in oats. Pfeiffer suggests that silicic acid can replace part of the phosphoric acid in stems and leaves and thus leave more phosphoric acid free for the organic combinations present in the grain.—*A. J. Pieters.*

4746. PITT, J. M. Farmers' experiment plots. Winter green fodder experiments, 1922. Agric. Gaz. New South Wales 34: 175-180. 2 fig. 1923.—Heaviest yields were secured from certain varieties of oats combined with a legume. Inclusion of a legume with oats made a very decided increase in yield. Satisfactory yields were secured from wheat grown for green forage.—*L. R. Waldron.*

4747. POLE, EVANS, I. B. Ambari or Deccan hemp: *Hibiscus cannabiss* L. Jour. Dept. Agric. Union of South Africa 1: 570-580. Pl. 1-4. 1921. [Reprinted from South African Jour. Indust. 1: No. 3.]—Ambari, an erect annual yielding a bast fiber called Bimlipitam jute, Deccan hemp, and Gambo, is native in Africa and now widely distributed through India, Asia, and Australia. It is cultivated in India (also in Senegal where its fiber is called "da"). It is abundant and troublesome as a weed in some localities in South Africa. The plant grows 5-11 feet high, with considerable variation in branching, time of maturity, and robustness. The stem and leaf stalks are prickly and the seed pods bristly. No attempt has been made to produce the fiber in South Africa, but samples of the fiber from plants in different stages of maturity and different periods of water retting, 27-72 days, have been submitted to the Imperial Institute in London, which reports that if properly prepared, this fiber might find a ready market, serving the same purpose as jute. Experiments at Pretoria show that the plants may be retted in 10-14 days with water at 18-26°C., yielding 10.7-11.9 per cent of good fiber. Improving the plants and developing methods for preparing the fiber are necessary to establish the industry in South Africa.—*Lyster H. Dewey.*

4748. POPP, M., und J. COUTZEN. Die Bedeutung einer Magnesiadüngung für unsere Kulturpflanzen. [The importance of magnesium fertilization for cultivated plants.] Landw. Jahrb. 58: 313-354. 1923.—This is a study of the influence of magnesium on the growth of cultivated plants. The results may be summarized as follows: The addition of various salts of magnesium to potassium salts, both on sandy and peat soils, did not influence appreciably the yield of various crops. The crop yield is greatly influenced by the physiological reaction of the fertilizing salts, depending on the reaction of the soil. The potassium content of plants is greatly influenced by the potassium fertilizer; however, the former cannot be used as an index of the latter. In some cases of low crop yields, due to lack of potassium fertilizer, as in the cases of grasses and straw, the percentage content of potassium may be higher than in the crops receiving applications of this fertilizer. The magnesium content of plants has usually been incorrectly recorded. The tables of Stutzer need to be corrected. The magnesium content of plants is not influenced appreciably by potassium or magnesium fertilizer. The utilization of soil potassium is usually parallel to that of soil magnesium. The quantities of magnesium present in most soils are sufficient for the need of the cultivated plants tested.—*S. A. Waksman.*

4749. PRIDHAM, J. T. Jottings on the past season at Cowra. Agric. Gaz. New South Wales 34: 159-160. 1923.—Varieties of oats, wheat, and peas are discussed.—L. R. Waldron.

4750. SMALL, JOHN K. The Austrian field cress again. Torreyia 23: 23-25. 1923.—Supplementing the notes of A. A. Hansen in Torreyia 22: 73-77 [see Bot. Absts. 12, Entry 48] on the occurrence in New York, of *Roripa austriaca* Spach, for which Small here creates the new combination *Radicula austriaca* (Crantz) Small, the author reports the finding of the same plant by A. L. Stone on the farm of the University of Wisconsin. It produces no fruit, and is propagated readily by the roots. It seems to have been imported in alfalfa seed from Turkestan, and is spreading rapidly.—J. C. Nelson.

4751. STROUP, FREEMAN P. Corn and its products. Amer. Jour. Pharm. 94: 788-797. 1922.—A popular lecture.—Anton Hogstad, Jr.

4752. STUART, W. The potato: its culture, uses, history, and classification. ix + 518 p, 5 pl., 267 fig. J. B. Lippincott Co.: Philadelphia and London, 1923.—This is a comprehensive and practical treatise dealing with the many factors involved in the production of potatoes in the U. S. A. The industrial uses of the crop are enumerated, the botany and history are given in summary form, and potato breeding and selection are discussed. Classifications are reviewed, a modification of that of the author (U. S. Dept. Agric. Bull. 176) being supplemented by plates in colors of typical tubers and floral organs of leading varieties. A student's project in growing potatoes for profit, a list of varieties with their characteristics, groups and origin for each, and the yearly average acreage and production by states and by the Canadian provinces are appended.—H. M. Steece.

4753. WAGNER. Die Bedeutung der Gründüngung unter den heutigen Verhältnissen. [The significance of green manuring under present conditions.] Mitteil. Deutsch. Landw. Ges. 38: 201-203. 1923.—In this address the speaker reports his personal experiences with green manures. The value of clover, either red or a mixture of red, alsike and white, seeded in grain and turned under for the next grain crop, is especially emphasized.—A. J. Pieters.

4754. WILSON, H. C. Comparative costs of production of oats for grain and hay on stubble and fallow land. Jour. Dept. Agric. Victoria 19: 306-309. 1921.—Comparative experiments indicate that oats for grain and hay can be grown at much less cost per bushel and ton, respectively, on fallowed land than on stubble or green ploughed land, even in a season of good rainfall, when the stubble land has the advantage. Yield of hay per acre was 61 hundred weight on fallowed land and 38 hundred weight on stubble land, which made the cost of production 29 s. 3 d. and 39 s. 3 d. per ton, respectively. When grown for grain, fallow land gave 62.4 bushels and stubble land 38 bushels per acre. After allowing for the sale of straw, the actual cost per bushel was 1 s. $\frac{1}{8}$ d. for fallow land and 1 s. 4 $\frac{1}{8}$ d. for stubble land.—W. J. Morse.

4755. YANTIS, R. E. Farm acreages, values, etc. Texas Dept. Agric. Bull. 70. 42 p. 1922.—A map of Texas shows chief crops of each area. Statistics are given in tabulated form by counties, of ownership, expenditures, acreage, etc.—L. Pace.

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

CARROLL W. DODGE, *Editor*

CHARLES A. WEATHERBY, *Assistant Editor*

(See also in this issue Entries 4930, 4990, 5020, 5129, 5131, 5142, 5163, 5166)

4756. ANONYMOUS. A curatorship of plant pathology. Brooklyn Bot. Gard. Rec. 10: 18-19. 1921.—Announcement is made of a gift to the Brooklyn Botanic Garden of \$50,000 to become available over a period of 4 years from Jan. 1, 1921, for research in plant pathology. Also announcement of the appointment of George Matthew Reed as curator of plant pathology to have charge of the new work.—C. S. Gager.

4757. ANONYMOUS. **A new botanic garden.** Brooklyn Bot. Gard. Rec. 12: 23. 1923.—This proposed new botanic garden and arboretum at Joliet, Illinois, has a nucleus of 327 acres, on which, according to Willard N. Clute, commissioner in charge of the grounds, practically every kind of American tree that will stand the climate has been growing for nearly 20 years. Other commissioners are Messrs. James H. Ferriss and Pilcher of Joliet.—C. S. Gager.

4758. ANONYMOUS. **A new botanic garden in Holland.** Brooklyn Bot. Gard. Rec. 11: 111-112. 1922.—The University of Utrecht has come into possession of a 2nd botanic garden, presented to the botanical department of the university by the heirs of August Janssen, deceased in 1919. The tract, known as "Cantonspark," is situated on the outskirts of the village of Boarn, about 18 km. from Utrecht. A. Pulle, professor of systematic botany, University of Utrecht, has been made director of the new garden, while F. A. F. C. Went retains the directorship of the botanical garden in Utrecht.—C. S. Gager.

4759. ANONYMOUS. **An index to periodical literature.** [Rev. of: The subject index to periodicals. K: science and technology. 555 p. Library Association: London, 1922.] Nature 111: 214-215. 1923.—This contains titles of 15,000 papers published in 400 periodicals during the years 1917-19.—O. A. Stevens.

4760. ANONYMOUS. **Note.** Nature 111: 266. 1923.—An exhibit has been installed at Kew Gardens, consisting of funeral wreaths, etc., from Egyptian tombs of 1100 and 1700 B. C. The flowers chiefly used are *Nymphaea coerulea*, *Acacia arabica* var. *nilotica*, together with leaves of *Mimusops Schimperii* and *Salix Safsaf*. These are identical with species found growing at the present day.—O. A. Stevens.

4761. ANONYMOUS. **Obituary. Prof. Gaston Bonnier.** Nature 111: 265. 1922.—This is a brief note on the activities of Bonnier. "His published research on the correlation of function, form, and structure of plant organs is as remarkable for its simplicity and clearness of style as for its scientific value." He "played a most important part in the reform and extension of the teaching of the natural sciences in France."—O. A. Stevens.

4762. ANONYMOUS. **The Knox Arboretum and Botanic Garden.** Brooklyn Bot. Gard. Rec. 11: 113. 1922.—The new arboretum and garden between Thomaston and Warren, Maine, is being developed under the auspices of the Knox Academy of Arts and Sciences. This institution, established in 1908, now has 60 acres. The director is Norman W. Lermond. There is a growing library and herbarium, and a List of Trees and Shrubs in the Knox Arboretum has been published.—C. S. Gager.

4763. ANONYMOUS. **The old Linnean garden at Upsala.** Brooklyn Bot. Gard. Rec. 11: 112. 1922.—This is a quotation from an article by C. S. SKOTTSBERG [Bull. Misc. Information, Kew, No. 6, 1920] on the restoration of Linnaeus' botanic garden according to the original plan.—C. S. Gager.

4764. ANONYMOUS. [Rev. of: RHODE, ELEANOR SINCLAIR. **The old English herbals.** xii + 243 p. Longmans, Green and Co.: London, 1922.] Nature 111: 143. 1923.—The book is very readable, but the limitation to English herbals is unfortunate in the respect that few of these had any influence on the course of botany.—O. A. Stevens.

4765. BRIDEL, MARC. **Emile Bourquelot, 1851-1921.** Bull. Soc. Chim. Biol. 3: 253-258. 1921.—A biographical sketch is presented. Bourquelot discovered 6 enzymes,—trehalase, pectosase, pectinase, seminase, gease, and gentiobiase,—and considerably extended knowledge of inulase, invertin, lactase, maltase, gaulterase, and the oxidases. His most important contribution to enzyme chemistry was the discovery of the synthetic action of certain enzymes and consequently of the reversibility of enzyme action.—Joseph S. Caldwell.

4766. EBERLE, E. G. **Clement Belton Lowe.** Obituary. *Amer. Jour. Pharm.* **95**: 159-162. *Pl. 1.* 1923.—This is a sketch of the life and activities of Dr. Lowe, Professor Emeritus of *Materia Medica*, Philadelphia College of Pharmacy, who died Feb. 5, 1923. He was editor of *The Medicinal Plants of the Philippines*, author of *A Syllabus of the Botanical Natural Orders*; and an active member of the American Pharmaceutical Association.—*Anton Hogstad, Jr.*

4767. EBERLE, E. G. **Edward Morell Holmes.** *Jour. Amer. Pharm. Assoc.* **12**: 193-195. *Pl. 1.* 1923.—This is a brief sketch of the British botanist, who has concluded a half-century as curator of the Museum of the Pharmaceutical Society of Great Britain. He was awarded the British Pharmaceutical Society's bronze medal for an herbarium of British plants, the Flückiger medal, and the Hanbury medal. Reference is made to some of the collections of the museum sorted and catalogued by Holmes.—*Anton Hogstad, Jr.*

4768. EBERLE, E. G. **Émile Perrot, D. ès-Sc.** *Jour. Amer. Pharm. Assoc.* **12**: 289-290. *Portrait.* 1923.—Perrot, Hanbury medalist, 1922, distinguished himself by his researches on *materia medica*, which include the various species of *Cinnamomum* and *Strychnos*, the gentians, coriander fruits, Kinkeliba, savin, ginseng, kola nuts, balsam tolu, etc. The most important research is that published with M. Goris, on the stability of vegetable drugs and the preparation of what have been termed "physiological vegetable extracts" or "intracts." The process for these involves the destruction of all enzymes, whereby the drugs and their preparations possess the physiological action of the fresh plant and retain it indefinitely.—*Anton Hogstad, Jr.*

4769. GERSHENFELD, LOUIS. **Louis Pasteur.** *Amer. Jour. Pharm.* **94**: 766-782. 1922.—The life and varied scientific activities of Louis Pasteur are reviewed.—*A. Hogstad, Jr.*

4770. HAAN, H. R. M. DE. **Overzicht der koffieliteratuur.** [Survey of coffee literature.] *Mededeel. Proefsta. Malang.* **39.** 58 p. 1923.—A list of 678 numbered titles arranged alphabetically by authors is followed by a classified list in which the titles are referred to by number only.—*J. R. Schramm.*

4771. LAWALL, CHARLES H. **The romance of spices.** *Amer. Jour. Pharm.* **95**: 193-223. *Fig. 1-8.* 1923.—This popular lecture contains brief notes concerning individual spices.—*Anton Hogstad, Jr.*

4772. LENDNER, A. M. **Eugène Privat, Avocat.** [Eugene Privat.] *Bull. Soc. Bot. Genève* **13**: 34-35. 1921.—This charter member and former president of the Botanical Society of Geneva died Dec. 1, 1921.—*W. H. Emig.*

4773. MALTE, M. O. **The first fifty years of the Arnold Arboretum.** *Canadian Field Nat.* **37**: 28-30. 1923.—A synopsis is given of a paper with the above title appearing in the *Jour. Arnold Arboretum* **3**: 127-171. 1923.—*W. H. Emig.*

4774. NEWCOMBE, C. F. **Menzies' Journal of Vancouver's Voyage, April to October, 1792.** *Archives of British Columbia, Victoria,* 1923.—Besides the text of the Journal, the publication contains a biography of Menzies (by J. Forsyth), and a list of Menzies' publications and of plants collected by him on the northwest coast of America. The plants are grouped as follows: (1) ferns and flowering plants, 335 species; (2) mosses, 24 species; (3) lichens, 18 species; (4) marine algae, 22 species.—*G. B. Rigg.*

4775. NICLOUX, MAURICE. **Armand Gautier, 1837-1920.** *Bull. Soc. Chim. Biol.* **3**: 248-252. 1921.

4776. RUDOLPH, ADELAIDE. **Henry Vincome Army.** *Jour. Amer. Pharm. Assoc.* **12**: 99-100. *Pl. 1.* 1923.—This is a brief sketch of the president-elect of the American Phar-

maceutical Association for 1923-1924. As teacher, author, editor, research worker, and association worker his labors have been unremitting and effective. He was awarded the Remington Honor Medal for 1922.—*Anton Hogstad, Jr.*

4777. SEDGWICK, WILLIAM THOMPSON. **Darwin and Pasteur: an essay in comparative biography.** Science 57: 286-289. 1923.—This essay, left unfinished at the death of the author, compares the methods and results of these 2 men.—*C. J. Lyon.*

4778. SMITH, LOUIE H. Professor J. G. Mosier. Jour. Amer. Soc. Agron. 15: 29-30. 1923

4779. STURMER, J. W. **Johnny Appleseed.** Amer. Jour. Pharm. 94: 699-702. 1922.—The life and activities are sketched of John Chapman, better known as Johnny Appleseed, one of the most picturesque pioneers of the Ohio Valley. Arriving there in 1806, he planted his first nursery near the present town of Steubenville. His seedlings and seeds were distributed without charge, and several of the trees, near Fort Wayne, Indiana, are still bearing fruit. He preceded the country doctor and the village apothecary, being a pioneer in supplying medicine to the settlers. [Printed also in Jour. Amer. Pharm. Assoc. 11: 1022-1024. 1922.]—*Anton Hogstad, Jr.*

4780. UPHOF, J. C. TH. **An historic spot for students of genetics.** Jour. Heredity 13: 343-345. 3 fig. 1923.—A description is given of the place where in 1886 Hugo de Vries found his mutations of *Oenothera Lamarckiana* on the Spanderswoud estate near Hilversum, Netherlands. At that time the land was a neglected potato field; at present it is partly covered with *Fagus sylvatica* and *Picea excelsa*. By 1921 the forest had developed to a point where it threatened the early extinction of the *Oenotheras*. Accompanying photographs, probably the first ever published of this place, show a general view of the field as it was in 1908, with *Oenotheras* under the beech forest, a wild mutant of *O. oblonga*, and 2 plants of *O. Lamarckiana*.—*J. C. Th. Uphof.*

4781. WHITE, ORLAND E. **Botanical exploration in Bolivia.** Brooklyn Bot. Gard. Rec. 11: 93-105. 1922.—This is a report to the Director of the Brooklyn Botanic Garden on the botanical work of the Mulford Expedition for the Biological Exploration of the Amazon Basin, June 1, 1921-April 14, 1922.—*C. S. Gager.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 4854, 4905, 4932, 4983, 4989, 4990, 5049, 5051, 5176, 5178)

4782. ANONYMOUS. **Prospectus, 1921.** Brooklyn Bot. Gard. Rec. 10: 1-18. 1921.—The educational work offered at the Brooklyn Botanic Garden during 1921 is included.—*C. S. Gager.*

4783. ANONYMOUS. **Prospectus of courses, lectures, and other educational advantages offered to members and to the general public, 1922.** Brooklyn Bot. Gard. Rec. 11: 1-20. 1922.

4784. ANONYMOUS. **Prospectus of courses, lectures, and other educational advantages offered to members and to the general public, 1923.** Brooklyn Bot. Gard. Rec. 12: 1-20. 1923.

4785. ANONYMOUS. [Rev. of: GILBERT-CARTER, H. **Guide to the University Botanic Garden, Cambridge.** xvi + 117 p., 24 pl. University Press: Cambridge, 1922.] Nature 111: 216. 1923.

4786. BUCKMAN, H. O. The organization of a general introductory course in soils and the extent to which it should be based on pure science. *Jour. Amer. Soc. Agron.* 15: 55-59. 1923.

4787. CLARKE, LILIAN J. The botany gardens of the James Allen's Girls' School, Dulwich. 52 p., 10 pl., 1 map, 2 diagr. Board of Education Educational Pamphlet. No. 41. H. M. Stationery Office: London, [date ?] The history and work of the botany gardens, used as an adjunct or outdoor laboratory in connection with the botany classes, is recounted. The main object in developing the gardens has been to make the teaching of botany thoroughly practical by closely associating indoor with outdoor work. Textbooks have been abandoned, the girls being taught to make their own. The garden, of about $\frac{3}{4}$ of an acre, is divided into plots for photosynthesis experiments, plots for pollination experiments, climbing plants on upright screens, beds showing the natural orders (families), vegetable gardens, plant associations including chalk plants, heath plants, a pebble beach, a sand dune, a salt marsh, a small wood produced by planting chiefly *Quercus pedunculata*, and a lane. The instruction given under the above heads is outlined in detail, and lists are given of the species successfully grown in each of the above plots. Only 40 minutes a week is allowed the pupils for this work.—C. S. Gager.

4788. CONARD, HENRY S. That plant. *Science* 57: 359-360. 1923.—In response to Martin's request [see Bot. Absts. 12, Entry 2984] for suggestions for a good definition of a plant, the writer states that he has used the following, which, is particularly useful in showing that definitions are at best a mere makeshift: "A plant is a living thing which manufactures its own food from the raw materials of earth and air, or one whose ancestors did so."—C. J. Lyon.

4789. DUCEILLER, F. [Rev. of: CHODAT, R. *La biologie des plantes. I. Les plantes aquatiques. (Biology of plants. I. Aquatic plants.)* 311 p. Atar: Geneva, 1922.] *Bull. Soc. Bot. Genève* 13: 36. 1921.—The "Biology of plants" by R. Chodat is a book which has no equal.—W. H. Emig.

4790. ETHERIDGE, W. C., and M. L. FISHER. Report of the committee on lectures for a standard introductory course in field crops. *Jour. Amer. Soc. Agron.* 15: 41-42. 1923.

4791. GORTNER, R. A. What is a plant? *Science* 57: 614. 1923.—The author, a chemist, suggests a chemical definition for a plant, "a living organism whose cell walls consist predominately of carbohydrate materials."—C. J. Lyon.

4792. GREAVES, JOSEPH E. *Agricultural bacteriology.* xv + 437 p., 48 fig. Lea & Febiger: Philadelphia and New York. 1922.—The book is divided into 36 chapters. The first 4 are devoted to the history of bacteriology, occurrence, morphology, and classification of bacteria. Physiology is treated in the following 7 chapters, including the composition and metabolism of bacteria, bacterial enzymes, and influence of temperature, light, and other physical factors as well as chemical agents upon bacteria. Soil bacteriology occupies the largest portion of the book, covering the next 15 chapters. These are devoted to the study of the influence of heat, volatile antiseptics, arsenic, salts, and manure on bacterial activities in the soil; followed by a study of methods for the determination of the soil flora, solvent action of bacteria, carbon-, nitrogen-, sulfur-, and phosphorus-cycle of bacteria and the most important transformations in the soil, namely, decomposition of nitrogenous and non-nitrogenous organic matter, nitrification and denitrification, symbiotic and non-symbiotic nitrogen fixation, and crop rotation. Of the remaining 10 chapters, 1 is devoted to bacteria in air, 2 to water bacteriology, 1 to sewage, 2 to milk, 3 to food bacteriology, food poisoning, and preservation of food, and 1 to bacteria in arts and industries.—S. A. Waksman.

4793. GUIGNARD, LÉON. *Le jardin botanique de la faculté de pharmacie de Paris.* [The botanic garden of the faculty of pharmacy of Paris.] 3rd rev. ed., 179 p. Librairie-Marqueste:

Toulouse, 1922.—The principal characters of the various groups of plants cultivated in this botanic garden are given. A few plants not grown in the botanic garden are mentioned because of their interest.—*C. S. Gager.*

4794. JORDAN, E. O. *A text-book of general bacteriology.* 7th ed., 744 p. W. B. Saunders Co., Ltd.: Philadelphia and London, 1922.—In this edition the chapters on influenza and anaerobes have been entirely rewritten, and chapters on streptococci, pneumococci, and typhus fever extensively revised. Important additions have been made to the sections on immunity, yellow fever, and others. The chapter on methods of studying bacteria has been entirely rewritten and enlarged.—*C. S. Gager.*

4795. KENDALL, ARTHUR ISAAC. *Bacteriology, general, pathological, and intestinal,* 2nd ed. rev., xi + 630 p., 99 engravings, 8 col. pl. Lea and Febiger: New York and Philadelphia, 1921.—Section I, general bacteriology; section II, pathogenic bacteria; section III, higher bacteria, molds, yeasts, filterable viruses, and diseases of unknown etiology; section IV, gastro-intestinal bacteriology; section V, applied bacteriology. The author emphasizes what bacteria do, rather than what they are,—how they enter tissues, how they feed, excrete, and reproduce, how they escape from the body, and the chemistry of bacterial activity. New technique of handling bacteria, laboratory equipment, and applications of bacteriology in preventive medicine, serology, and vaccine treatment of disease are emphasized.—*C. S. Gager.*

4796. LÜHNIS, F., and E. B. FRED. *Textbook of agricultural bacteriology.* ix + 283 p., 9 pl., 66 fig. McGraw-Hill Book Co. Inc.: New York, 1923.—Most of the material was published in 1913 under the title *Vorlesungen über landwirtschaftliche Bakteriologie*. The present book is not merely a translation from the earlier German work, but is also a thorough revision and rearrangement with the aim of better adapting the book to American and British needs. The introduction is followed by Part I, general morphology and physiology of bacteria and related organisms, with 7 chapters, respectively on: morphology of bacteria and related organisms; development of bacteria, etc.; classification of bacteria, fungi, and protozoa; relations of microorganisms to their environment; counting, isolating, cultivating, and testing bacteria, etc.; sterilization, pasteurization, antiseptics, and asepsis; activities of bacteria, etc. Part II, dairy and soil bacteriology, with 7 chapters, respectively on: bacteria, etc., in food-stuffs; bacteria, etc., in milk; bacteria, etc., in butter; bacteria, etc., in cheese; sewage disposal; bacteria, etc., in barnyard manures; bacteria, etc., in soils.—*C. S. Gager.*

4797. MADISON, HAROLD L. *Trees of Ohio identified by their leaves.* 9 x 19 cm., 24 p., 116 fig. Cleveland Museum of Natural History: Cleveland, Ohio, 1922.—This booklet constitutes No. 1 of the Pocket Natural History series to be issued by the Museum.—*J. R. Schramm.*

4798. REYNOLDS, E. S., and R. T. HANCE. *Pruning the academic tree.* *Science* 57: 408–410. 1923.—This is an argument for a general survey course in biology to take the place of 2 specialized courses in elementary botany and zoology. It is claimed that this arrangement is much better for the general student; and for the student going on in either field the necessary technical training is given in the next higher courses.—*C. J. Lyon.*

4799. SOSMAN, ROBT. B. *A first revised edition of the Academy's list of one hundred popular books in science.* *Jour. Washington [D. C.] Acad. Sci.* 12: 469–476. 1922.

4800. TIFFANY, L. H. "What is a plant?" *Science* 57: 359. 1923.—The writer states his belief that it is better to let the student form his own definition from his observations, rather than to have him learn such a definition as Martin seeks [see *Bot. Absts.* 12, Entry 2984].—*C. J. Lyon.*

4801. WOLFE, J. K. Comparative grades in field crops courses. Jour. Amer. Soc. Agron. 13: 59-66. 1923.

4802. YOUNGKEN, H. W. Pharmacognosy and the pharmacist. [Editorial.] Jour. Amer. Pharm. Assoc. 12: 5-6. 1923.—The author calls attention to the many opportunities for those specializing along different lines of pharmacognosy. Commenting upon the requirements for those who desire to become trained pharmacognosists, the author states that the 2-year course is entirely inadequate, and that preparation for the profession should embody, in addition to the necessary studies of the first 2 years, many other subjects, such as English, German, French, zoology, advanced chemistry, etc.—Anton Hogstad, Jr.

CYTOLOGY

GILBERT M. SMITH, *Editor*

(See also in this issue Entries 6967, 5070, 5283)

4803. ARBER, A. Studies on the binucleate phase in the plant cell. Jour. Roy. Microsc. Soc. London 1920: 1-21. Pl. 1, fig. 1-2. 1920.—The binucleate condition is a normal feature of the cells in certain parts of the plants studied. The appearance and the origin, as interpreted by the author, of the duplicate nuclei is described for the following plants: *Eremurus himalaicus*, *Asparagus officinalis*, *Helianthus Nuttallii*, *H. tuberosus*, *Syringa vulgaris*, *Monstera deliciosa*, *Hemerocallis fulva*, *Nothoscordum fragrans*, *Alisma Plantago*, *Polygonum cuspidatum* (= *Polygonum Sieboldii* other authors?) *Morus nigra*, *Hippuris vulgaris*, *Elodea canadensis*, and *Stratiotes aloides*. Some of these were reexamined in view of the findings of previous authors that the binucleate phase had arisen in them by amitosis, which view is combated.—Wm. Randolph Taylor.

4804. BEER, R., and A. ARBER. On multinucleate cells: an historical study (1879-1919). Jour. Roy. Microsc. Soc. London 1920: 23-31. 1920.—This historical review emphasizes the authors' view that the reported cases of amitotic duplicate nuclei in vegetative cells are in reality due to mitosis.—Wm. Randolph Taylor.

4805. CHAMBERS, R. New apparatus and methods for the dissection and injection of living cells. Jour. Roy. Microsc. Soc. London 1922: 373-388. Fig. 1-5. 1922.—By means of 3 screws, bars held together at the ends by springs are forced apart so that the free arm of the series can have motion imparted to it in 1 or more of 3 planes. To this end is attached a carrier for a dissection needle or capillary pipette. The "Micro-manipulator" may be attached directly to the microscope or to a pillar. An improved type of pipette for injection into the cells consists of a Luer syringe attached by means of delicate brass tubing to the "micro-pipette." The methods of using the apparatus are described.—Wm. Randolph Taylor.

4806. CONN, H. J. Safranin and methyl green. Science 57: 304-305. 1923.—A sample of pure, concentrated safranin obtained from the National Aniline Co. gives excellent results in contrast staining and is as good as pre-war Grübler safranin O. Both the Providence Chemical Laboratories and the above company have submitted samples of methyl green that are satisfactory and comparable with the Grübler product.—C. J. Lyon.

4807. COWDRY, EDMUND V., and PETER K. OLITSKY. Differences between mitochondria and bacteria. Jour. Exp. Med. 36: 521-533. 1922.—The suggestion that mitochondria, found in almost all active cells, are symbiotic microorganisms, would, if verified, exercise a profound influence in biology and medicine. The only reaction thus far claimed to be specific is that of coloration with Janus green B. The authors have attempted to make a direct comparison of Janus green reactions of mitochondria in living lymphocytes and bacteria under exactly the same conditions. Bacteria showing all possible variations have been studied. To rabbit blood was added a small drop of bacterial emulsion and a solution of Janus green in

0.85 per cent saline solution; the whole was mixed by the weight of the cover glass. Mitochondria stained with intensity up to a dilution of 1:100,000. The bacteria were not colored in so high a dilution. The pancreas of a rabbit was also injected with various bacteria, killed, fixed, and stained by various methods. The authors state that the mitochondria and bacteria show "microchemical and tinctorial differences which can only be attributed to a fundamental dissimilarity in their chemical constitution."—*C. S. Hoar*.

4808. DANGEARD, P. A. **Recherches sur la structure de la cellule dans les Iris.** [Concerning the structure of the cells of Iris.] *Compt. Rend. Acad. Sci. Paris* 174: 1653-1659. *Fig. 1 a-e; 2 a-f.* 1922.—A study is reported of the mesophyll and epidermal cells of young and mature leaves of *Iris germanica*. Fixation with the Laguesse solution is preferable to that of Regaud. The development of the plastids in young leaves is described. It is found that the epidermal cells contain elongated slender mitoplasts of an oily nature. Dangeard herewith abandons entirely the terms chondriome, mitochondria, chondriocotes, and chondriomites. He reaffirms his usage of vacuome for the metachromes and ordinary vacuoles, which may give rise to metachromatic corpuscles, anthocyan, or tannin; plastidome, in which are included plastids, mitoplasts, amyloplasts, chloroplasts, etc; and sphérome, the micromes which are related to the formation of oil.—*C. H. Farr*.

4809. DANGEARD, P. A. **Sur la structure de la cellule chez les Iris.** [Concerning the structure of the cells of Iris.] *Compt. Rend. Acad. Sci. Paris* 175: 7-12. *Fig. 1 (A, B, C), 2 (A, B, C, D), 3 (A, B, C, D, E).* 1922.—A study is made of the conductive tissues, petals, sepals, stamens, ovary, and ovules of *Iris germanica*. Figures are shown of cells from the conductive tracts, stamens, and ovary. It is concluded that the plastidome and sphérome are permanent cell organs like the nucleus, and that they are transmitted independently from generation to generation. The plastids of the plastidome have various forms as spheroplasts, mitoplasts, and discoplasts, and perform various functions, as xanthoplasts, carotinoplasts, chloroplasts, amyloplasts, oleoplasts, etc. The microsomes of the sphérome are normally spherical (spherosomes), but may be rod-shaped (mitosomes), and there is some evidence that they may form fat globules (oleosomes). The plastidome and sphérome exist in the pollen grains and embryo sacs, and are therefore to be considered in discussing the transmission of hereditary characters.—*C. H. Farr*.

4810. DREW, A. H. **Preliminary tests on the homologue of the Golgi apparatus in plants.** *Jour. Roy. Microsc. Soc. London* 1920: 295-297. *4 fig.* 1920.—Fixation of onion root tips with a formol-cobalt nitrate-sodium chloride mixture at 37°C., cutting on a freezing microtome, washing and mordanting at 50-55°C. with chromic-osmic mixture, and staining with iron-alum haematoxylin and pyridine showed numerous granular or short rod-shaped mitochondria. With longer mordanting these became less evident and oval and elongate bodies appeared. With still longer treatment the Golgi apparatus showed as filaments and rods near the nuclei.—*Wm. Randolph Taylor*.

4811. GATENBY, J. B. **Further notes on the oögenesis and fertilization of *Grantia compressa*.** *Jour. Roy. Microsc. Soc. London* 1920: 277-282. *Pl. 5.* 1920.—In the sponges the sperm does not penetrate the egg directly but first enters another cell which transfers it to the ripe oocyte. This is unique among animals. The sperm enters a collar cell where it changes from a probably filiform to a rounded shape. Confirmation is offered of Dendy's description of a process whereby in oögenesis pieces of the nucleolus are extruded into the cytoplasm.—*Wm. Randolph Taylor*.

4812. GATENBY, J. B., and J. H. WOODGER. **On the relation between the formation of yolk and the mitochondria and Golgi apparatus during oögenesis.** *Jour. Roy. Microsc. Soc. London* 1920: 129-156. *Pl. 2, fig. 1-4.* 1920.—An outline is given of the appearance of different cytoplasmic inclusions when prepared by different methods, and definitions of these elements of the cell. In yolk formation in *Grantia* eggs the yolk granules were found to be formed

in the ground cytoplasm independently—not from mitochondria. In Mollusca (*Helix* and *Limnaea*) Golgi elements, mitochondria, and yolk spherules are present in the ripe egg. The germinal epithelia contain Golgi elements and probably also mitochondria. These spread out during development, throughout the oocyte. In the mollusc *Patella* the Golgi elements take an important part in yolk formation, which is more complicated than in *Helix* and *Limnaea*. In Amphibia and Insecta, represented by *Rana* and *Triton*, or *Apanteles* and *Dytiscus* respectively, the mitochondria form a filamentous mass on the peripheral part of the growing oocyte. Later when yolk formation begins the mitochondria may be throughout the oocyte but the yolk discs are formed only at the periphery. "It seems natural to conclude that the yolk grains of the egg are formed from metamorphosed mitochondria, as is believed to occur in other animals." In *Stenobothrus* and *Dytiscus* the Golgi elements seem to be unconnected with the yolk. In *Periplaneta* some of the yolk spheres seem to be formed in the nucleolus and shot out into the egg cytoplasm. For Ascidians the work of Hirschler (1915) is quoted. In *Ascaris* the work of Hirschler (1913) is preferred to that of Fauré-Fremiet, excepting that the mitochondria occasionally swell up to form the large yolk granules. The Golgi elements are not generally intimately associated with the yolk spheres. In Mammalia the Golgi apparatus is at first juxta-nuclear and excentric, but later spreads out, possibly taking no direct part in the formation of yolk or fat. Although true chromatinic chromidia occasionally occur in the cytoplasm during oogenesis (Hymenoptera) almost all cases in Metazoa are really misinterpretations of the mitochondria. Reports of chromatin emission during oogenesis probably are ill-founded.—*Wm. Randolph Taylor*.

4813. GRAY, JOHN. A critical study of the facts of artificial fertilization and normal fertilization. Quart. Jour. Microsc. Sci. 66: 419-437. 1922.—The author refers to the theory of Loeb that artificially fertilized eggs are activated by 2 substances, a specific cytolysin, which brings about the destruction of the surface layer of the egg, and a substance which limits or controls the destructive influence of the cytolysin; and to the theory of F. R. Lillie that the union of the egg and spermatozoon is possible only in the presence of a specific substance or fertilizin secreted by the unfertilized egg. The author claims that not enough attention is given to the physical forces. Loeb's theory serves only for artificial fertilization and Lillie's only for the natural type. The facts appear to indicate that the normal action of the spermatozoon on the egg is essentially physical. Evidence is advanced that the activation of an unfertilized egg by a spermatozoon is due to the electromotive force set up when the 2 gametes come into contact. After activation, normal development occurs only when 2 asters are present. The formation of a fertilization membrane in echinoderm eggs is discussed. Finally the view is expressed that the only essential effect of egg secretions on spermatozoa is the capacity of these substances, in certain cases, of increasing the activity of the male gametes.—*C. S. Hoar*.

4814. GRAY, JOHN. Surface tension and cell division. Quart. Jour. Microsc. Sci. 66: 235-245. 1922.—It has long been held that surface tension plays the dominant rôle in cleavage. Surface tension has been thought to differ at various places on the cell surface. The author shows that regions of differential surface tension are an unnecessary assumption. It is an equilibrium between a force inside the cell and surface tension which determines shape of the dividing cell. The author uses fertilized eggs of *Echinus miliaris*, *Coleps hirtus*, and 2 oil drops in acid and normal sea water to prove his point. He claims that cell division is due to movement of 2 asters away from each other and that the cleavage furrow is due to an equilibrium between the effect of this movement on the protoplasm and the surface tension of the cell surface.—*C. S. Hoar*.

4815. GUIGNARD, L. Sur l'existence de corps protéiques particuliers dans le pollen de diverses Asclépiadacées. [On the existence of certain protein bodies in the pollen of diverse Asclepiads.] Compt. Rend. Acad. Sci. Paris 175: 1015-1020. Figs. 1-16. 1922.—In *Asclepias syriaca*, *A. curassavica*, *A. linifolia*, and *Gomphocarpus fruticosus*, pollen tubes, pollen mother cells, and microspores were studied as to the protein granulations and plastids. The protein

bodies are said to resemble chondriosomes, especially chondriocentes. They appear first as granulations, which form short beads, and then slender rods. These protein bodies are for a time within the plastids, later the breaking down of the plastids leaves the protein bodies free. In the last stage these bodies fuse together in a mass.—*C. H. Farr.*

4816. GUILLIERMOND, A. Observation cytologique sur un *Leptomit* et en particulier sur le mode de formation et la germination des zoospores. [Cytological observations on a *Leptomit* and especially the mode of formation and germination of its zoospores.] *Compt. Rend. Acad. Sci. Paris* 175: 377-379. *Fig. 1-6.* 1922.—This is a fungus found on dead fish. Figures and a description are given of mitochondria,—here observed in living condition for the first time in an aquatic fungus.—*C. H. Farr.*

4817. GUILLIERMOND, A. Remarques sur la formation des chloroplastes dans le bourgeon d'*Elodea canadensis*. [Remarks on the formation of chloroplasts in the bud of *Elodea canadensis*.] *Compt. Rend. Acad. Sci. Paris* 175: 283-286. *Fig. 1-11.* 1922.—Mitochondria and chondriocentes are described in the cells of the tissues studied. The author reaffirms his interpretation that there are 2 categories of chondriosomes, one having to do with photosynthesis; the function of the other is not known precisely.—*C. H. Farr.*

4818. HOGBEN, L. T. A preliminary account of the spermatogenesis of *Sphenodon*. *Jour. Roy. Microsc. Soc. London* 1921: 341-352. *Fig. 1-18.* 1921.—Five types of chromosomes are present, 25 being tentatively suggested as the diploid number. The possibility is offered that the 3 pairs with the sub-terminal fiber attachment are really pairs of paired chromosomes, thus giving 32 as the diploid number. The chromosomes of the different complexes correspond in size and shape. There are inconstant bodies (of nucleolar origin?) which pass with the chromosomes to the poles of the spindle. The parasynaptic view of chromosome origin is accepted and the stages described in this light.—*Wm. Randolph Taylor.*

4819. JEFFREY, E. C. Professor Lloyd and vegetable crystals. *Science* 57: 442-444. 1923.—This is a defense and reiteration of previous statements as to the manner of growth of druses in cells.—*C. J. Lyon.*

4820. KOZŁOWSKI. Critique de l'hypothèse des chondriosomes. [A criticism of the hypothesis of the chondriosomes.] *Rev. Gén. Bot.* 34: 641-658. *Pl. 11.* 1922.—In the cytoplasm of plant cells substances frequently occur in the form of droplets in suspension. One substance is in the form of very refractive, colorless droplets (lipoid droplets); another in the form of very small less refractive droplets (mitochondria). Mitochondria appear as more or less long series of pearls called chondriomites or chondriocentes; as spheres; or as amoeboid formations called plastids. The form of these agglomerations is dependent on the structure of the protoplasmic network. In the living cells, the granular structure of the chondriocentes, the chondriomites, and the plastids is readily discernable; in fixed and stained preparations this structure becomes less distinct,—even if the granular structure is not altered by the fixative, staining with haematoxylin effaces it. Investigators of fixed and stained tissues have frequently observed the chondriosomes as short rods or filaments and homogeneous globules differing in one dimension and have concluded that the small droplets elongate in the same direction and form in this way the homogeneous filaments. The latter transform themselves, so they say, by swelling, into plastids. A study of living tissues does not justify this hypothesis. Guillermond explains the granular structure of these formations, having studied them in living cells, as the result of an alteration of homogeneous filaments under the influence of water. This explanation is not justified because the granular structure of the chondriomites is very distinct in the living cells of aquatic plants that can be studied directly with the microscope. The hypothesis of the formation of plastids from chondriosomes, supported by Forenbacher, Lewitsky, Meves and Guillermond is justified, but the interpretation of the mechanism of this phenomenon does not correspond to the reality, according to the author. The plastids are formed by the agglomeration of droplets and not by their swelling. The hypothe-

sis of multiplication of chondriosomes and of plastids by division is incorrect. The dumb-bell form of chondriosomes and plastids is produced by the juxtaposition of 2 elements, not by their division. Finally, the author holds that the different hypotheses concerning the diverse physiological functions of the chondriosomes most frequently arise from preconceived ideas.—*J. C. Gilman.*

4821. KRAEMER, HENRY. **The starch grain.** *Science* 57: 175. 1923.—The author, stimulated by Sponsler's paper [see Bot. Absts. 12, Entry 4843], describes his own attempt to study the complex nature of the grain by treatment with aniline dyes, experiments which were once successful but which have never been repeated in spite of many trials.—*C. J. Lyon.*

4822. KULMATYCKI, W. J. **Bemerkungen über den Bau einiger Zellen von *Ascaris megalocephala* mit besonderer Berücksichtigung des sogenannten Chromidialapparates.** [Observations regarding the structure of certain cells of *Ascaris megalocephala*, with special consideration of the so-called chromidial apparatus.] *Arch. Zellf.* 16: 473-551. *Pl.* 22-26. 1922.—An account is given of the structure of the cells of the digestive tract, of the body wall muscles, and of the copulatory organs of *Ascaris megalocephala*, with special reference to the presence and nature of chromidia and the Golgi apparatus. "Chromidia" (the term is enclosed within quotation marks throughout the paper) are found in the flat epithelial-muscular cells of the oesophagus, in the subcutaneous and glandular cells of the rectum, in the pre-rectal dilator muscles, and in the muscles controlling the action of the copulatory spicules. None was found in the cells of the mid-gut, of the body wall muscles, or of the pre-rectal sphincter muscles. The "chromidia" vary in form; spherical ones are commonest in all cells, often strung together like a string of pearls. No evidence was found of the passage of material forming the "chromidia" from the nucleus. On the other hand, when stained by means of Benda's mitochondria method, they react exactly as do mitochondria. For this reason, and because of their general similarity in form and appearance, the author considers them to be closely related to mitochondria. He therefore rejects the term "chromidia," as applied to the structures observed in this genus, and calls them "Ascaridochondria." In the mid-gut cells, there are small spherical bodies surrounding the nucleus, which react to 2 per cent osmic acid and probably represent Golgi bodies. Their nature is not perfectly certain, owing to the absence of "ascaridochondria." In the subcutaneous cells of the spicular sheath, however, both "ascaridochondria" and Golgi bodies are present, the latter in the form of rods and spheres, evenly scattered throughout the cell. "Ascaridochondria" and Golgi bodies are probably unrelated structures.—*R. E. Cleland.*

4823. LENOIR, MAURICE. **La cinèse somatique dans la tige aérienne d'*Equisetum arvense* L.** [On the somatic mitosis in the aerial stem of *Equisetum arvense*.] *Compt. Rend. Acad. Sci. Paris* 174: 1559-1562. 1922.—A description is given of the nuclear condition in the interphase, prophase, metaphase, anaphase, and telophase. It is concluded that the fundamental substance of the chromosome is the nucleoline, called by other authors pyrenine or plastine, and that chromatin is a derivative.—*C. H. Farr.*

4824. LENOIR, MAURICE. **Les nucleoles pendant la prophase de la cinèse II du sac embryonnaire du *Fritillaria imperialis* L.** [The nucleoli during the prophase of the second division of the embryo sac of *Fritillaria imperialis*.] *Compt. Rend. Acad. Sci. Paris* 175: 985-987. 1922.—The substance of the nucleoli passes without apparent modification into a spirematic filament by a sort of aspiration. Between the beginning of this phenomenon and the formation of the chromosomes there is a period during which an equilibrium is established between the 2 chromatic substances, the chromatic network and the nucleoli.—*C. H. Farr.*

4825. LLOYD, FRANCIS E. **The cytology of vegetable crystals.** *Science* 57: 273-274. 1923.—The views of the writer are in opposition to those expressed by Jeffrey (*Science* 55: 566. 1922). Lloyd finds that druses in the cells of the buds of Ginkgo develop in the cytoplasm, grow, and crowd the nucleus and cytoplasm to the sides of the cell. More than one druse may

appear in a cell. The cell wall does not grow or change its shape to allow for the growth of the druse but actually seems to limit the shape of the druse. Conclusions from observations of conditions in Cactaceae, Orchidaceae, Iridaceae, and Begoniaceae are in harmony with those stated for *Ginkgo*.—*C. J. Lyon*.

4826. LUDFORD, R. J. Contribution to the study of the oögenesis of *Patella*. Jour. Roy. Microsc. Soc. London 1921: 1-14. Pl. 1-2. 1921.—The yolk forms under the influence of the Golgi bodies, and this proceeds until the egg is filled with spherical yolk bodies surrounded by Golgi elements. The layer of Golgi elements then breaks up and fragments form a layer under the vitelline membrane as well as around the nucleus. Nucleolar material is extruded into the cytoplasm. Mitochondria are present, but take no direct part in yolk formation.—*Wm. Randolph Taylor*.

4827. LUDFORD, R. J. The behavior of the nucleolus during oögenesis, with special reference to the mollusc *Pattella*. Jour. Roy. Microsc. Soc. London 1921: 121-133. Pl. 3-4. 1921.—During the transition from an undifferentiated cell of the germinal epithelium to an oocyte the cytoplasm changes from oxyphil to basiphil, in which condition it remains until the time the Golgi elements have become scattered, when the oxyphilia increases again. The nucleolus has definite oxyphil and basophil parts, which usually separate into distinct spherical bodies. There is an extrusion of an oxyphil substance from the nucleolus during the differentiation of the nucleolus that may be related to yolk formation; the basophil part may be related to the condensation of the discrete chromosomes.—*Wm. Randolph Taylor*.

4828. LUDFORD, R. J. The morphology and physiology of the nucleolus. Pt. 1. The nucleolus in the germ-cell cycle of the mollusc *Limnaea stagnalis*. Jour. Roy. Microsc. Soc. London 1922: 113-150. Pl. 3-5. 1922.—The nucleus is lacking in the cells of the germinal epithelium, but in the development of an oocyte 1 appears that increases in size during development, performing amoeboid movements, with the extrusion of portions into the cytoplasm. A portion of the oxyphil nucleolus becomes basophil, which part persists till the end of oogenesis, when it breaks up and is distributed over the nuclear reticulum; the oxyphil part mostly passes out into the cytoplasm during oogenesis. In spermatogenesis an oxyphil nucleolus is present in the spermatocyte that persists until drawn into the massed reticulum in synzeosis, disappearing before diakinesis and not reappearing during the further stages in the maturation of the sperm. In the Sertoli (nurse-) cells of the ovatestis the nucleolus is characteristically enlarged. During nuclear fusion in fertilization the nucleoli seem to be absent. By the time of the late blastula stage an oxyphil nucleolus is again observable which disappears during each prophase and reappears at telophase. Mesoderm cells in the gastrula have especially large nucleoli. The cells of the adult in active metabolism have large nucleoli, the quiescent cells small ones.—*Wm. Randolph Taylor*.

4829. LYON, M. W., JR. Acetone in tissue work. Science 57: 444-445. 1923.—F. M. McFarland's observations [see Bot. Absts. 12, entry 194] on the successful use of acetone in place of alcohols for dehydrating tissues used for paraffin sections are confirmed. Pure acetone is used between xylene and water and may also be used as a solvent of such stains as eosin.—*C. J. Lyon*.

4830. MCKENZIE, G. A. Methods used in animal histology. Ann. Rept. Trans. Manchester Microsc. Soc. 1921: (Reprinted without change of page nos. from Lancashire and Cheshire Nat., June 1921, pp. 259-262). 1922.—Brief notes are given on fixatives (with formulae), the paraffin method, the celloidin method, and on staining with haematoxylin and Van Gieson's stain.—*C. E. Allen*.

4831. MARTENS, P. Le cycle du chromosome somatique dans les phanérogames. I. *Paris quadrifolia* L. [The cycle of the somatic chromosome in phanerogams. I. *Paris quadrifolia*.] La Cellule 32: 333-428. 4 pl. 1922.—The chromosome of *Paris quadrifolia* is at all

stages composed of 2 morphologically distinct constituents: a homogeneous achromatic matrix and a chromatic substance enclosed within it. In early prophase the chromatic constituent ("chromonematic element") lies peripherally in the matrix in the form of transverse or oblique curved strands; many of these are joined in the form of a zigzag thread, but they do not form a continuous spiral throughout the length of the chromosome. The chromosome elongates, the chromonematic element taking the form of a slender filament with the achromatic matrix condensed irregularly about it. As the chromosome again shortens and thickens, the matrix regains its regular lateral outlines and becomes a flattened ribbon. The zigzag chromonematic element now undergoes a "bilateral repartition": the chromatic substance flows from its transverse portions and collects at its angles along the margins of the ribbon, thus forming 2 lateral rows of swellings connected by the attenuated transverse portions. These swellings become somewhat elongated, and as the chromosome shortens further those in each row unite to form a continuous filament along the chromosome margin. The 2 marginal filaments are thrown into zigzags by the continued shortening of the chromosome. The achromatic ribbon then divides by a simple repartition into 2 longitudinal portions, completing the division of the chromosome, except for a few fine chromatic connections which remain until anaphase. The division of the chromosome does not involve a longitudinal cleavage of the slender chromatic filament, and it is not brought about by an alveolation: it occurs later, after the chromosome is somewhat shortened, by a bilateral repartition (not splitting) of the chromonematic element into 2 new zigzag filaments, this being followed by the division of the achromatic matrix. The slender chromatic filament of the prophase forms only a portion of the metaphase chromosome, and not all of it as some have supposed. In each daughter chromosome of the metaphase the chromonematic element occupies the periphery of the matrix except on the side toward the sister chromosome: each chromosome has a sort of bilateral symmetry, and the chromatic portions of the 2 may be likened to a pair of troughs facing each other. There is no continuous spireme, no transverse division of chromosomes, and no division of chromomeres.—During late prophase, metaphase, and anaphase, the achromatic matrix shows a pronounced chromaticity, which obscures the structure of the chromosome; this is probably due to an impregnation by the material of the nucleolus which disappears during these stages and reappears after the tassement polaire when the matrix again becomes achromatic.—In telophase the chromatic substance becomes arranged in 2 parallel masses in the chromosome, apparently along the edges of the chromatic "trough" seen at metaphase, thus establishing an actual duality within the chromosome. This duality is not the result of alveolation, and it does not represent the first stages of division, for it gradually disappears in late interphase or early prophase, leaving the chromatic matter in the form of a simple filament, which in later prophase gives rise to 2 daughter filaments by repartition. Chromosome division is therefore prophasic, and involves a repartition of both the chromonematic element and the achromatic matrix.—*L. W. Sharp.*

4832. MASCRÉ. Sur l'étamine des Borraginées. [The stamens of the Boraginaceae.] *Compt. Rend. Acad. Sci. Paris* 175: 987-989. 1922.—The following species were studied; all were found to be alike: *Symphytum officinale*, *Anchusa italica*, *Cynoglossum officinale*, *Borrago officinale*, *Echium vulgare*, *Pulmonaria officinalis*, *Cerinthe major*. The formation of the partition separating the pollen chambers, the dissolution of the tapetum, the changes of the archesporial cells, and the transformation of the chondriosomes into chondriocontes and plastids are described. As in the Solanaceae, the tapetum passes through 3 successive stages: differentiation; elaboration or secretion; and degeneration.—*C. H. Farr.*

4833. MASUI, KIYOSHI. The spermatogenesis of domestic mammals, I. The spermatogenesis of the horse (*Equus caballus*). *Jour. Coll. Imp. Univ. Agric. Tokyo* 3: 357-376. *Pl.* 11-13, *fig.* 1-2. 1910-1919.—Conjugation of the chromatin threads is by parasynapsis. The heterotypic division is followed by the homotypic. In the resulting 4 cells, 2 have 18 chromosomes and 2 have 19, 1 in each of the latter being the accessory chromosome. Mitochondria appear during the postsynaptic stages.—*E. R. Walker.*

4834. MASUI, KIYOSHI. The spermatogenesis of domestic mammals, II. The spermatogenesis of cattle (*Bos taurus*). Jour. Coll. Agric. Imp. Univ. Tokyo 3: 377-403. Pl. 14-16, fig. 1. 1910-1919.—Conjugation of the chromatin is probably by telosynapsis. The heterotypic division is followed by the homotypic. In the 4 resulting cells $\frac{1}{2}$ have 16 chromosomes and $\frac{1}{2}$ have 17, 1 being the accessory chromosome. Mitochondria appear abundantly during growth stages.—E. R. Walker.

4835. MEYER, ARTHUR. Die "Hülle" der Chromatophoren. [The "envelope" of the chromatophore.] Ber. Deutsch. Bot. Ges. 40: 161-167. 1 fig. 1922.—The outer region of the chromatophore was described by Senn (1908) as a "peristromium," which was thought to be concerned with the movement of the chromatophore. The writer is inclined to the view that this structure belongs to the slimy cytoplasm and that the latter is responsible for the movement of the chromatophore. The slimy cytoplasm is of one kind, but it may show different microscopical modifications. When "normal" it is very fluid and contains granules; when "metabolisiert" it is relatively firm and free from granules. The latter type surrounds the chromatophores giving a false impression of a differentiated part of the chromatophore.—L. F. Randolph.

4836. PARTINGTON, J. R., and D. B. HUNTINGBORD. The reduction of osmic acids by lipoids. Jour. Roy. Microsc. Soc. London 1921: 15-19. 1921.—"The substance formed by the reduction of osmic acid by olein in tissue staining was found to be a hydrated form of osmic dioxide, OsO_2 , and not metallic osmium, as has sometimes been stated."—Wm. Randolph Taylor.

4837. PISEK, A. Chromosomenverhältnisse, Reduktionsteilung und Revision der Keimentwicklung der Mistel (*Viscum album*). (Vorläufige Mitteilung.) [Chromosome relations, reduction division and revision of the embryogeny of the mistletoe (*Viscum album*). (Preliminary note.)] Ber. Deutsch. Bot. Ges. 40: 406-409. 1922.—In *Viscum album* the somatic chromosome number is 20, and a reduction to 10 occurs in both micro- and megasporogenesis. Normal fertilization takes place 10 days after pollination. A month later the endosperm begins to develop slowly, and after another month the fertilized egg divides. The species is amphimictic, the development of embryos by ovulate plants protected from insects reported by Heinricher being the result of wind pollination rather than apogamy.—L. W. Sharp.

4838. SÁNCHEZ Y SÁNCHEZ, MANUEL. Sur la nature et la fonction de l'appareil réticulaire de Golgi. [On the nature and function of the reticular apparatus of Golgi.] Compt. Rend. Acad. Sci. Paris 175: 1439-1440. 1922.—This study was made on the seed epidermal cells of *Faba vulgaris*. Argentophile granules are found. Infranuclear, perinuclear, and supranuclear trabeculae are present, confirming the earlier work by others on the presence of this apparatus in plant cells.—C. H. Farr.

4839. SCHRADER, FRANZ. A study of the chromosomes in three species of *Pseudococcus*. Arch. Zellf. 17: 45-62. Pl. 5-6. 1923.—The following were studied: *Pseudococcus nipae*, *P. maritimus*, and *P. citri* (order Homoptera, family Coccidae). The earliest phase of the growth period of the primary spermatocyte is characterized by the presence of a loose, delicate chromatin network, and, also, by a large deeply staining mass. From each of these, 5 chromosomes are organized. Those arising from the large mass are formed earlier, and tend to remain closely associated; those coming from the reticulum develop later, and lie loosely scattered around the others. When fully formed, all 10 chromosomes show a single longitudinal split. There is no pairing at this stage, and the 1st division is an equational division, not a reduction division. In anaphase, the 10 chromosomes passing to each pole are in 2 groups of 5 each. At the pole they are arranged as before, into 1 group of 5 closely associated chromosomes, and another of 5 loosely scattered ones. There is no regular interkinesis. In the 2nd spermatocyte division, reduction occurs, but apparently in an anomalous manner, the 2 groups of 5 being separated to different parts of the cell. This nuclear division is not followed by cyto-

plasmic division. Each cell is a double spermatid, and gives rise to 2 spermatozoa. No such anomalous behavior was observed during the maturation of the egg. It was not possible to tell, however, whether the female is homozygous for the massed, or for the loose group of chromosomes. In the somatic cells of the male, the clump of densely staining chromatin appears again, as well as the more lightly staining and flocculent network. Corresponding cells in the female show no clumping. It may be that the loose group of chromosomes lacks certain properties which would make them equivalent to the massed group. This lack may be indicative of a loss, or it may be that the group is in the way of disappearing, in which case the origin of haploid males is near solution. The female of *Pseudococcus* is homozygous, and the male heterozygous for sex.—*Ralph E. Cleland.*

4840. SCHÜRHOFF, P. N. **Die Befruchtung von *Viscum album* L.** [Fertilization in *Viscum album*.] Ber. Deutsch. Bot. Ges. 40: 314-316. Fig. 1-6. 1922.—The generative nucleus, while still in the pollen grain, divides after the pollen tube is formed. The 2 male nuclei and the vegetative nucleus then pass into the pollen tube.—*W. C. Muenscher.*

4841. SMITH, EDNA L. **The histology of certain orchids with reference to mucilage secretion and crystal formation.** Bull. Torrey Bot. Club 50: 1-16. Pl. 1. 1923.—Study of the floral organs of the orchids *Aspasia* sp. and of *Oncidium stipitatum* shows that mucilage cells are found in young actively growing regions and are associated with raphides. It is argued that mucilage originates in the protoplast, since the mucilage is separated from the cell wall by the thin layer of cytoplasm and the nucleus, which are in a living and active condition. The raphides are imbedded in the mucilage and separated from it by a sheath of different staining capacity. In *Polystachya minuta* and *Orchis spectabilis*, also, raphides and mucilage are found occurring together.—*P. A. Munz.*

4842. SPAUL, E. A. **The gametogenesis of *Napa cinerea* (water scorpion).** Jour. Roy. Microsc. Soc. London 1922: 231-242. Pl. 10-11. 1922.—The diploid complex for the male was 35, short rods with little size variation beyond 2 pairs of short chromosomes. The spireme forms the bouquet stage, followed by contraction to 1 pole. Later the diplotene filaments emerge from this, showing signs of cleavage. After the tetrad stage the chromosomes form the plate with 1 unpaired chromosome, which may precede the rest to the pole or lag behind. This is the "heterochromosome," which divides in the 2nd division. In the oögonia the diploid number was 36, so that this chromosome is there paired. The nucleolus seems to emit particles which take part in the formation of yolk.—*Wm. Randolph Taylor.*

4843. SPONSLER, O. L. **The structure of the starch grain.** Amer. Jour. Bot. 9: 471-492. 9 fig. 1922.—The problems presented by starch and various theories concerning the structure of the grain are discussed. These grains have been regarded by most investigators as sphere-crystals. By means of X-rays it is possible to determine whether a given powdered substance is amorphous or crystalline; and if the latter, its crystal system may be determined. This method of study consists in photographing the X-rays which are reflected from the various atomic planes of a crystal and produce definite lines. In describing this method, the modern conceptions of the crystal, the atom, and the X-rays are discussed. The author applied the method to a study of starch and describes in detail the apparatus used. This apparatus was tested by photographing with it crystals of sodium chloride, the structure of which is known. Definite lines were produced in photographs of this substance, but none by such an amorphous substance as dextrin. When studied thus, starch was found to produce definite lines on the photographic negative, thus resembling true crystalline structures. Ground and crushed starch grains, however, did not show these lines but behaved like an amorphous substance. If starch is truly crystalline such crushing should make no difference. Pulverized cane sugar, for example, gave results identical with the crystallized sugar. The author concludes that there is a regular and fairly uniform arrangement of atoms in the starch grain but that this regularity is destroyed by crushing the grain and hence cannot be that of a true crystal. The regularity of starch may not be that of planes but that of curved layers.—*E. W. Sinnott.*

4844. TAKAHASHI, NABUYOSHI. Ueber Kernveränderungen in Ganglienzellen der Fische. [Nuclear changes in the ganglion cells of fishes.] Arch. Zellf. 16: 463-472. Pl. 21. 1922.—In the central nervous system and spinal ganglia of a large number of fishes there is an invagination, or series of invaginations, in one side of the nuclear membrane. As a result the nuclei appear to be eaten out; in some cases roughly, in others smoothly. They may even become crescentic in shape. At times the chromatin of the nucleus is massed near this region, but not in all cases. This phenomenon seems to be restricted to the spinal sensory cells and to the sheath elements. It is still further localized, being found only in the largest cells, and in those which are packed into solid tissues; i.e., in cells which because of their size and compactness are unfavorably situated from the standpoint of respiratory and metabolic change. So far as studied all of the species of any one order of fishes reveal a like localization of this condition.—R. E. Cleland.

4845. T'SERCLAES, J. DE. Le noyau et la division nucléaire dans le *Cladophora glomerata*. [The nucleus and its division in *Cladophora glomerata*.] La Cellule 32: 313-326. 2 pl. 1922.—Nuclear division in *Cladophora glomerata* is similar to that of higher plants in chromosome behavior, but differs in its complete lack of an achromatic figure, as well as in the fact that the nuclear cavity remains clearly delimited throughout the entire process.—Material collected in winter and kept in running water at 12°C. in the laboratory showed most active nuclear division between 9 and 10 p.m. The resting nucleus has a delicate reticulum and 1 or more nucleoli. In prophase the reticulum becomes more chromatic and breaks up into reticulate elements, the chromosomes, which condense into separate slender threads—there is no continuous spireme. In some cases the chromosomes are more condensed from the first, as in higher plants with small chromosomes. In either case they eventually assume the form of short thick rods. In 1 nucleus 68 were counted. After shortening, the chromosomes split longitudinally, this being the first clearly described case of such splitting in green algae. There is no indication of chromomeres. The nucleus becomes lenticular in shape, and the split chromosomes group themselves variously about its major axis, not forming a regular equatorial plate as in forms having achromatic figures.—The nucleus elongates in the direction of its former shorter axis; its membrane remaining intact as the longitudinal halves of the chromosomes separate and pass toward opposite poles within it. Although the different chromosomes do not separate simultaneously, they form 2 distinct opposed groups at late anaphase. Meanwhile the principal nucleolus (other small ones have disappeared) elongates, stretches and breaks at the middle into 2 portions associated with the 2 chromosome groups. Occasionally the breaking up is more irregular, some nucleolar fragments being left in the cytoplasm between the 2 new nuclei, where they are later resorbed.—In telophase the chromosomes soon lose their parallel orientation, develop small openings, and become joined by connections arising through contacts to form a continuous reticulum, in which the chromosomes may be recognized as heavier strands. The nuclear cavity is now dumb-bell shaped, but just how the 2 new nuclear cavities are finally completed is uncertain; it is possible that the tubular connecting portion may sometimes constrict as other authors have described, but often the connection, with nucleolar fragments in it, is still visible after the cavities of the daughter nuclei are almost completely closed in.—L. W. Sharp.

4846. WAGNER, KARL. Ueber die Entwicklung des Froscheies. [The development of frogs' eggs.] Arch. Zellf. 17: 1-44. Pl. 1-4. 1923.—An extensive study was made of the development of the female germ cells of *Rana fusca* Roes., from the earliest appearance of oögonia until the formation of the polar bodies. Particular attention is given to the question of the continuity of the chromosomes during this period, and to the relation between the chromosomes and the nucleoli. The author, by a proper use of stains, traces the chromosomes entirely through the germinal vesicle stage. During this period the chromosomes, in form like a "cylindrical chimney brush," gradually lose both basi- and oxy-chromatin substances, and consist almost entirely of linin. Hence the failure of certain authors to observe them at this time. The principal conclusions reached are: (1) the chromosomes are demonstrable at all times during the period of egg development; (2) they are not derived from the nucleoli.—Ralph E. Cleland.

4847. WEISS, F. E. Variations in the nuclear constitution of plants. Presidential address to the Manchester Microscopical Society. Ann. Rept. and Trans. Manchester Microsc. Soc. 1921: (Reprinted without change of page nos. from Lancashire and Cheshire Nat., Mar.-Apr. 1922, p. 193-199). 1922.—A brief account is given of the present state of knowledge, with special reference to chromosome behavior. The author discusses the doubling of the chromosome number in gametic unions, chromosome reduction in *Spirogyra*, *Puccinia graminis*, ferns, and seed plants, the relation of chromosome number to mutation, the causes of changes in the number of chromosomes, and the relation of chromosomes to sexual differences.—C. E. Allen.

4848. WOLFF, CLARA. Ueber konzentrische Strukturen im Eikern von Coleopteren. [Concentric structures in the egg nuclei of the Coleoptera.] Arch. Zellf. 16: 443-462. Pl. 20, fig. 1-11. 1922.—The young oocytes were studied in the following beetles: *Sitodrepa panicea*, *Chlorophanus gibbosus*, *Calandra oryzae*, and *Niptus hololeucus*. Entire ovaries were dissected out in Koch's solution, and fixed in Petrunkewitsch's, Carnoy's, Bouin's, and strong Flemming solutions. The inner central portion (Centralkörper) of the nucleus contains the chromatin. Surrounding this, and separated from it by a membrane, is a rather broad region (Binnenzone) which gradually enlarges and in which are formed successively a number of additional concentric membranes. Around this is formed a 3rd region (Randzone) containing a coarse network, and separated from the cytoplasm and from the Binnenzone by definite membranes. The mode of development of these regions differs in detail in the different animals. The author believes that the outer concentric regions belong to the nucleus since the membrane outside the periphery is firmer than the ones that separate the 3 regions from one another; also because in *Niptus* the central region and the Binnenzone are not separated from each other until a late period. The formation of the membranes is discussed, and compared to the formation of Liesegang's rings. They are considered to be precipitation membranes.—R. E. Cleland.

4849. WOODBURN, WILHAM LOGAN. Spermatogenesis in *Asterella hemispherica*, Beam. Ann. Botany 36: 535-540. Pl. 20. 1922.—Previous to the last division of the spermatogenous cells, 2 small dense cytoplasmic caps appear on opposite sides of the nucleus from which spindle fibers become organized. They are neither permanent cell structures nor are they centrosomes. The blepharoplast is first seen as a densely staining body on the inner surface of a membrane which develops between the nucleus and the boundary of the protoplast. The mature sperm consists of a curved, club-shaped part, the nucleus, tapering to a slender point which is continued by the thread-like blepharoplast bearing 2 cilia.—W. P. Thompson.

ECOLOGY AND PLANT GEOGRAPHY

GEORGE D. FULLER, *Editor*

(See also in this issue Entries 4781, 4967, 4989, 5008, 5009, 5026, 5031, 5032, 5037, 5101, 5110, 5112, 5168, 5194, 5228, 5232, 5236, 5266)

GENERAL, CONDITIONS, MEASUREMENTS

4850. ANONYMOUS. [REV. OF: BLOMEFIELD, L. A naturalist's calendar, kept at Swaffham Bulbeck, Cambridgeshire. 2d ed., edited by Sir FRANCIS DARWIN. xviii + 84 p. Cambridge University Press: London, 1922 (see Bot. Absts. 12, Entry 2301). Nature 111: 112. 1923.

4851. BATESON, W. Area of distribution as a measure of evolutionary age. [Rev. of: WILLIS, J. C. Age and area: a study in geographical distribution and origin of species. With chapters by HUGO DeVRIES, H. B. GUPPY, MRS. E. M. REID, and JAMES SMALL. x + 259 p. Cambridge University Press: London, 1922.] Nature 111: 39-43. 1923.—"Every evolutionist agrees that, apart from disturbing elements, area is a measure of age. * * * Unfortunately no means are suggested by which we may tell whether a species or genus is a novelty or a relic." The reviewer is very skeptical about the hypothesis, but believes the book serves an excellent purpose in renewing the debate on mode of evolution and in making geographical distribution a live study.—O. A. Stevens.

4852. HOLDEFLEISS, P. *Methodologische Bemerkungen zu "Die Trieblänge der Fichten und das Wetter."* [Methodological observations on "The twig length of spruce and the weather."] *Mitteil. Deutsch. Landw. Ges.* 38: 158. 1923.—The author arranges the figures given by C. Kassner [see *Bot. Absts.* 12, Entry 2995] to show that the spring rainfall has the greatest influence on growth of new shoots of spruce.—*A. J. Pieters.*

4853. HOWELL, A. BRAZIER. *Agencies which govern the distribution of life.* *Amer. Nat.* 56: 428-438. 1922.—Various types of life are considered. Active forms are aquatic, fossorial, terrestrial, arboreal, volant. In case of sedentary types (most plants) character of habitat and type of seed distribution are important. Direct physical barriers are discussed. Life zones are determined by latitude, altitude, proximity to sea, prevailing winds, extreme or delimiting temperatures, and mean temperature during reproductive period. Faunal regions are largely determined by humidity. Smaller associations are determined by local conditions and chemical and mechanical character of the soil. Food conditions are of great importance in determining distribution. Enemies also limit ranges. These are grouped as passive competitive forms, which are perhaps the more important, and active enemies, which may be simply irritating or actually exterminating.—*P. W. Whiting.*

4854. RUTHVEN, ALEXANDER G. *The opportunities for research on the Michigan biota provided by the Michigan Geological and Biological Survey.* *Rept. Michigan Acad. Sci.* 22: 105-115. *Pl.* 1-8. 1920.—The author discusses the types of surveys conducted by the Biological Survey on the fauna and flora of Michigan, with maps showing the portions of the state where such surveys have already been conducted.—*Ernst A. Bessey.*

STRUCTURE, BEHAVIOR, SYMBIOSIS

4855. CHAPMAN, H. W. *Aster tripolium on salt marshes.* *Nature* 111: 256. 1923.—Individuals of this species observed at Dovercourt on fields overflowed at every high tide were all fleshy and rayless, but on fields separated by dykes the plants were thin and wiry, with well developed rays.—*O. A. Stevens.*

4856. RICHTMYER, F. K. *The reflection of ultraviolet by flowers.* *Jour. Optical Soc. Amer. and Rev. Sci. Instruments* 7: 151-168. 8 fig. 1923.—The author used a small portable, quartz spectrograph giving a spectrum 1.6 cm. long from $\lambda = .30\mu$ to $\lambda = .50\mu$ to get on the same plate and under approximately the same conditions of day light illumination a spectrogram of magnesium oxide surface (arbitrary standard for comparison) and several spectrograms, of increasing length of exposure, of the flower in question, in daylight. The slit of the spectrograph was sufficiently narrow to resolve clearly the Fraunhofer lines, which served to identify wavelengths. The flower and spectrograph were protected from direct sunlight by white cloth 2 feet above the flower. Data were secured on the ultra-violet reflection of some 30 Colorado flowers and 1 yellow spider. The precision is apparently of the order of 10-20 per cent. The tentative conclusions drawn are: (1) Few flowers reflect any considerable proportion of ultraviolet. Of 25 flowers studied only 4 (*Laciniaria punctata*, *Onagra biennis*, *Rudbeckia laciniata*, and *Solanum rostratum*) reflect more than 10 per cent of radiation shorter than $.38\mu$. (2) Certain yellow flowers show a distinct ultraviolet reflection band; others show no trace of it. It is pointed out that if the human luminosity curve were extended proportionately toward shorter wave lengths so that it stopped at $.3\mu$ instead of at $.4\mu$, the color of *Rudbeckia* would be purple instead of yellow. (3) Flowers differ in reflection of ultraviolet as widely as in the reflection of the visible spectrum. Contrary to expectation, no white flower reflected more than 4 per cent of $\lambda = .39\mu$. (4) There seems to be no similarity in the ultraviolet reflection of closely related species.—*J. R. Schramm.*

4857. SEIFRIZ, WILLIAM. *The gregarious flowering of the orchid Dendrobium crumenatum.* *Amer. Jour. Bot.* 10: 32-37. 1923.—All individuals of this species within the same general locality, including plants of very different ages, flower simultaneously. This flowering is not rhythmic, the intermediate periods varying from a few days to several months. In confirma-

tion of the theory of Burkill from data obtained at the Straits Settlements, the author finds that precipitation at Buitenzorg is unusually heavy about the 8th day before flowering. He concludes that simultaneous flowering in this species is the expression of a heritable factor, but that the exact time at which it takes place is determined by some environmental condition—either heavy rainfall or the accompanying temperature change.—*E. W. Sinnott*.

4858. STEVENS, O. A. **An amateur wild flower bed.** *Amer. Midland Nat.* 8: 164–171. 1923.—This is an account of observations made on a wild flower bed in Fargo, North Dakota, which was given ordinary treatment and ordinary neglect. Over 50 species were planted or allowed to grow.—*Sister M. Ellen*.

VEGETATION

4859. BEAUVERD, G. **Herborisations de 1921.** [Field trips for the year 1921.] *Bull. Soc. Bot. Genève* 13: 20–29. 1921.

4860. BERNARD, CH. **Coup d'oeil sur la végétation des Indes Néerlandaises.** [A survey of the vegetation of the Dutch East Indies.] *Bull. Soc. Bot. Genève* 13: 9. 1921.

4861. CAMPBELL, DOUGLAS, HOUGHTON. **Australian botanical notes. I. Queensland and New South Wales.** *Amer. Jour. Bot.* 10: 38–56. 5 fig. 1923.—This is an account of the author's visit to Queensland and New South Wales in 1921. He discusses the topography and climate of the regions through which he passed, describes in general their vegetation, and presents notes on a large number of those species which are particularly conspicuous or otherwise interesting.—*E. W. Sinnott*

4862. GUYOT, H. **Contribution phytogéographique sur le versant méridional des Alpes Pennines.** [A phytogeographic contribution for the southern slope of the Pennine Alps.] *Bull. Soc. Bot. Genève* 13: 185–216. 1921.—The character of the plants found in this region indicate that the valley of Valsorey has not been in intimate communication with the valley of Ollomont.—*W. H. Emig*.

4863. IRBY, L. G. **The redistribution and readjustment of tree life as it affects Australian and Tasmanian forestry.** *Proc. Australian Forest. Conference [Brisbane] 1922: 58–61.* 1922.—The geographical distribution of plants and some of the causes leading to limitations of natural distribution are discussed.—*C. F. Korstian*.

4864. PONCY, ROBERT. **Biologie et phénologie des marais de Sionnet.** [Notes on the biology of the bog at Sionnet.] *Bull. Soc. Bot. Genève* 13: 31–32. 1921.

4865. STEHLE, MABEL E. **Surface plankton protozoa from Lake Erie in the Put-in-Bay region.** *Ohio Jour. Sci.* 23: 41–54. Fig. 1–3. 1923.—The list of surface plankton protozoa includes 27 flagellates, 25 ciliates, and 14 rhizopods. The chlorophyll-bearing forms are thought to be present in greatest numbers at the surface between 3 and 5 p.m.—*H. D. Hooker, Jr.*

FLORISTICS

4866. BARBEY-GAMPERT, MME. **La flore des "Picos de Europa" (Espagne).** [The flora of the "top of Europe" (Spain).] *Bull. Soc. Bot. Genève* 13: 9–10. 1921.

4867. CHODAT, R. **La botanique en Italie d'après les monuments anciens.** [The flora of Italy in the vicinity of the ancient monuments.] *Bull. Soc. Bot. Genève* 13: 32–34. 1921.

4868. GUYOT, H. **Sur la flore du versant méridional des Alpes Pennines.** [The flora of the southern watershed of the Pennine Alps.] *Bull. Soc. Bot. Genève* 13: 17–18. 1921.—The xerophytic alpine flora in the valley of Ollomont reaches a higher altitude than the xero-

phytic flora in the valley of Valsorey. The area occupied by xerophytic plants is directly related to the distribution of *Pinus sylvestris*.—*W. H. Emig*.

4869. WILDEMAN, E. DE. **Les bambous en Afrique.** [Bamboos of Africa.] 36 p., 1 diagr. Extract from Congo. Rev. Gen. Colonie Belge. J. Goemaere: Brussels, 1921.—An examination of continental Africa leads to the conclusion that there is a definite relationship between the flora of the eastern part of the continent and that of Asia; this conclusion is supported by a study of bamboos. The following genera are recognized as indigenous to Africa: *Arundaria* Michaux, *Microcalamus* Franck, *Puelia* Franck, *Bambusa* Schreb., *Atractocarpa* Franck, *Oxytenanthera* Munro, *Oreobamboo* K. Schum., and *Guaduella* Franchet. Palaeontology gives no very definite evidence of the distribution of bamboos. The genera *Atractocarpa*, *Guaduella*, *Puella*, and *Oreobamboo* are apparently endemic but their affinities are far from well defined. In a general way it may be said that in the center and east of the continent tall bamboos dominate above rain forests at a relatively high altitude, rarely below 3,000 feet and often above 7,000 feet, frequently associated with certain types of conifers. The limits of the distribution of bamboos in Africa are given but the problems of bamboos in Africa are regarded as far from solution.—*Henri Micheels*.

APPLIED ECOLOGY

4870. BALDENSBERGER, PH. J. **Honey production in Egypt.** Amer. Bee Jour. 62: 418-419. 1922.—Honey is stored mainly in early spring from broad bean (*Vicia Faba*) and later from cotton and a variety of other plants.—*J. H. Lovell*.

4871. CARLING, A. **The hairy vetch.** Amer. Bee Jour. 62: 563. 1922.—*Vicia villosa* is a hardy biennial, enduring well weather that is hot and dry.—*J. H. Lovell*.

4872. COX, W. L. **Beekeeping in southwest Washington.** York's Bees and Honey 3¹⁰: 7-8. 1922.—Fireweed (*Epilobium angustifolium*) is the most important honey plant.—*J. H. Lovell*.

4873. DADANT, M. G. **Errors concerning honey-producing plants.** [Translation of: WUST, O. Irtümer unserer Bienennährpflanzen. Deutsche Illus. Bienenzeitg. 38: 86-88. 1921 (see Bot. Absts. 11, Entry 3647).] Amer. Bee Jour. 62: 266-267. 1922.—Plants with inconspicuous or green flowers are generally regarded as unattractive to bees, but many of them are good honey plants.—*J. H. Lovell*.

4874. DEMUTH, GEO. S. **Beekeeping and agriculture.** Gleanings in Bee Culture 50: 229-233. Fig. 1-4. 1922.—Notes are given on the pollination of coffee; buckwheat; alsike, red, and sweet clovers; and cotton.—*J. H. Lovell*.

4875. HENDRICKSON, A. H. **Wonder work of bees.** Gleanings in Bee Culture 50: 226-229. 1922.—Pollination of fruit-trees is popularly described.—*J. H. Lovell*.

4876. HOUSE, L. C. **Beekeepers look to "The Land of Honey."** Beekeepers Rev. 37: 5. 1922.—*Trifolium repens* and *T. hybridum* are so abundant in the Northern Peninsula of Michigan that this section is often called "Cloverland." Other common and valuable honey plants are dandelion, wild raspberry, and *Epilobium angustifolium*. An average of 50 pounds of honey per colony is easily obtained.—*J. H. Lovell*.

4877. KINDIG, B. F. **Nectar producing resources of Michigan.** Michigan Dept. Agric. Bull. 4. 19 p. 1922.—*Trifolium hybridum* and *T. repens* are the 2 chief sources of honey in Michigan, being especially well adapted to the low-lying heavy soils of the old lake bed. *T. hybridum* is extremely abundant in the northern part of the Lower Peninsula, and in the Upper Peninsula it covers thousands of acres with no bees to gather its nectar. A heavy growth of *Rubus idaeus* var. *aculeatissimus* follows the cutting of the hardwood forests, forming

almost impenetrable thickets. Its blooming period (about 2 weeks) precedes that of alsike clover. The honey is light in color and has a mild, excellent flavor. Following forest fires *Epilobium angustifolium* springs up in great abundance, and for several years yields a large surplus of fine water-white honey. In the northwestern counties of the Lower Peninsula *Asclepias syriaca* has extended over a large area; the honey is a very light amber color and has a rich fruity flavor. *Tilia americana*, formerly a major honey plant of the state, has become so rare that little basswood honey is produced. *Cirsium arvense* honey is stored in some localities yielding a white honey of very good flavor. The goldenrods (*Solidago rugosa*, *S. graminifolia*, etc.) are the most valuable sources of fall honey, furnishing a golden-yellow product with pronounced flavor. In the southern third of the Lower Peninsula *Bidens aristosa* is common in the swamps, and yields an amber-colored, strong-flavored honey.—Other honey plants of value are asters (*Aster multiflorus*, *A. vimineus*, *A. paniculatus*, etc.). *Verbena hastata*, *Mentha spicata*, *M. piperita*, *Acer rubrum*, *A. saccharum*, *Fagopyrum esculentum*, *Eupatorium perfoliatum*, cucumbers, and fruit bloom.—It is estimated that there are over 10,000 beekeepers in the state, and that 8,000,000 pounds of extracted honey and 2,000,000 pounds of comb honey are produced annually.—*J. H. Lovell*.

4878. KINDIG, B. F. The honey resources of Michigan. Amer. Bee Jour. 62: 545-547. Fig. 1-4. 1922.—*Trifolium hybridum* and *T. repens* grow together throughout the state but are most abundant on clay soils, particularly those once forming a part of the beds of lakes Huron and Superior. *Rubus idaeus* var. *aculeatissimus* is most common in the Upper Peninsula and in the Lower Peninsula north of a line drawn east and west through Cadillac. *Asclepias syriaca* is of value to the beekeeper in the northwestern part of the Lower Peninsula. There is a flow of light amber honey in the fall of the year which seems uniformly to have been overlooked. An average of 50 pounds or more per colony from goldenrods, Spanish needles, bone-set, buckwheat, purple vervain, and asters is not uncommon.—*J. H. Lovell*.

4879. LATHAM, C. J. Wild cucumber a honey plant. Gleanings in Bee Culture 50: 595. 1922.—*Echinocystis lobata* blooms 4-5 weeks and yields a light amber honey, which is very thick and of excellent flavor.—*J. H. Lovell*.

4880. MABBOTT, D. C. Food habits of seven species of American shoal-water ducks. U. S. Dept. Agric. Bull. 862. 67 p. 1920.—The vegetable food of these ducks consists mainly of species of *Niadaceae*, *Gramineae*, *Cyperaceae*, *Polygonaceae*, *Sparganiaceae*, *Nymphaeaceae*, *Rubiaceae*, *Compositae*, algae, and a few representatives of other shore or water plants.—*Julia M. Haber*.

4881. MCATEE, W. L. Waterfowl and their food plants in the sandhill region of Nebraska. U. S. Dept. Agric. Bull. 794. 37-77. 1920.—The sago pondweed, *Potamogeton pectinatus* and wild rice, *Zizania palustris*, form the best duck food.—*Julia M. Haber*.

4882. MERRILL, J. H. Honey plants of Kansas. Amer. Bee Jour. 62: 7-10. Fig. 1-4. 1922.—Kansas may be divided into 4 sections according to its honey plants and beekeeping conditions. In the northeast corner the rainfall ranges from 33 to 43 inches. The soil along the Missouri River consists of loess which is well adapted to fruit growing. In the western portion of this section the soils are glacial. This is the only part of the state in which *Trifolium repens* is valuable, but nectar secretion varies greatly in amount in different seasons. *T. hybridum* is not largely grown. *Melilotus alba* is nearly equal to white clover. Other honey plants are *Taraxacum officinale*, *Acer saccharinum*, *Tilia americana*, *Bidens aristosa*, and *Polygonum Persicaria*.—The soils in the southeast corner are derived from shale and are too acid for leguminous plants. The important honey plants are *Bidens aristosa*, *Melilotus alba*, *Polygonum Persicaria*, and *Solidago*. *Disopyros virginiana* furnishes early pollen and nectar.—The central part of the state lies between the altitude of 1000 feet on the east and 2000 feet on the west. The rainfall ranges between 21 and 31 inches. The soils are derived from sandstone, limestone, and shale. Beekeeping conditions are very favorable in the valleys of the

Arkansas, Kaw, Blue, Verdigris, and Solomon rivers. The most important honey plants are *Melilotus alba*, *Medicago sativa*, *Polygonum Persicaria*, and *Taraxacum*. *Monarda punctata* is abundant in the Arkansas River Valley; it has yielded 4 good honey crops in 10 years and averaged 100-150 pounds. The western section varies in altitude from 2000 to over 3000 feet; popularly it is known as the "short-grass region." The soils contain a high percentage of lime. *Cleome serrulata* grows in profusion and is a valuable honey plant. Alfalfa and sweet clover are the principal crops.—J. H. Lovell.

4833. PARK, WALLACE. Time and labor factors involved in gathering pollen and nectar. Amer. Bee. Jour. 62: 254-255. Fig. 1-2. 1922.—During the period of observation in 1920 and 1921 average colonies of bees stored respectively about 5 and a little over 1 pounds per day from *Melilotus alba*. In the 1st instance weather conditions were highly favorable; in the 2nd, mediocre to poor.—The maximum number of trips recorded in 1 day for a nectar carrying bee was 24 in 1920, and 17 in 1921. The average number of trips per day was $13\frac{1}{2}$ in 1920, and 7 in 1921. The average time per day spent in nectar-carrying, in 1920, was $8\frac{1}{2}$ hours, and, in 1921, $7\frac{1}{2}$ hours.—The maximum number of trips made per day by a bee gathering pollen from corn was 20, in 1920; in 1921, only 11. The averages were about 8 and $5\frac{1}{2}$ trips per day for the respective years. As a rule corn pollen was not available in the afternoon; the above figures therefore represent only about $\frac{1}{2}$ day in actual time.—The average minimum flying weight of an Italian bee is approximately 82 mgm. Maximum loads of nectar weighed nearly 70 mgm.; average loads, about 40 mgm. A maximum load of pollen weighed about $\frac{1}{3}$ of the weight of the bee, and less than $\frac{1}{2}$ that of a maximum load of nectar.—J. H. Lovell.

4884. PARKS, H. B. The American hollies as honey yielders. Beekeepers' Item 6: 9-10. 1922.—*Ilex opaca* extends from Massachusetts to Texas. Where abundant it yields well, and in some localities is the chief source of surplus. The honey is nearly white and has a mild flavor. Yaupon (*I. vomitoria*) and dahoon (*I. Cassine*) yield a very large amount of honey in the swamplands of the central South. The honey is amber-colored and has a peculiar flavor. It does not granulate quickly. Gallberry (*I. glabra*) and swamp gallberry (*I. decidua*) form immense thickets in the lowlands along the Atlantic and Gulf coasts. They bloom from May to June and yield an immense amount of honey. The average surplus stored per colony is usually 35-40 pounds, but a colony has been known to gather 150 pounds. The honey is light amber, very heavy, has a mild flavor, and does not granulate.—J. H. Lovell.

4885. PELLETT, F. C. Honey regions of Iowa. Amer. Bee Jour. 62: 453-455. Fig. 1-3. 1922.—The surface, climate, and soils of the state are briefly described. *Trifolium repens* is the main source of surplus honey in nearly every county. In every 5 years there is likely to be 1 big crop, 2 fair crops, 1 light crop, and 1 failure. *T. hybridum* is important in a few counties. The floral tubes of *T. pratense* are so long that, except under unusual conditions, it is not a valuable honey plant. The area of *Melilotus alba* is rapidly extending. In woodlands *Symphoricarpos orbiculatus* and *S. racemosus* yield a surplus in mid-summer. Other honey plants are heartsease, Spanish needle, willows, maples, dandelion, asters, and fruit-trees.—J. H. Lovell.

4886. PELLETT, F. C. Prickly comfrey. Amer. Bee Jour. 62: 109. Fig. 1. 1922.—*Symphyltum asperifolium* yields perhaps as large amounts of forage as any plant known. The bloom is attractive to bees, but there is no information available as to the amount of honey procurable from it.—J. H. Lovell.

4887. PELLETT, F. C. The annual sweet clover. Amer. Bee Jour. 62: 95-97. Fig. 1-5. 1922.—Annual or Hubam sweet clover (*Melilotus alba* var.) can be used in a 2-year rotation. While the Hubam is better for a catch crop, the biennial is apparently better in fields, when it is desired to grow sweet clover for a series of years. Hubam clover offers a long honey flow, and each acre of this plant, it is believed, will support 1 colony of bees.—J. H. Lovell.

4888. PHILLIPS, E. F., and G. S. DEMUTH. **Beekeeping in the buckwheat region.** U. S. Dept. Agric. Farmer's Bull. 1216. 26 p., 6 fig. 1922.—The buckwheat beekeeping region includes New York, Pennsylvania, northeastern Ohio, western Maryland, and West Virginia; $\frac{2}{3}$ of the entire buckwheat area in the U. S. A. is in New York and Pennsylvania. In New York buckwheat yields nectar freely during the forenoon: the flow ceases early in the afternoon. Secretion is reduced or stopped when the temperature falls below 70°F. It is most abundant when the nights are cool and the days warm and calm. Early bloom or late bloom secretes little, or not at all. In the glaciated plateau region of New York and Pennsylvania nectar is secreted best on the Volusia and DeKalb soils, formed by the disintegration of shale and limestone. The honey is dark colored and strong flavored. Only extracted buckwheat honey should be produced.—As buckwheat secretes nectar so late in the summer, the colonies of bees under proper care are likely to reach maximum strength before the nectar is available. A system of management is required which will result in a full honey crop and at the same time control European foulbrood, which is very prevalent in the buckwheat region.—J. H. Lovell.

4889. PHILLIPS, E. F., and G. S. DEMUTH. **Beekeeping in the clover region.** U. S. Dept. Agric. Farmers' Bull. 1215. 27 p., 7 fig. 1922.—The clovers doubtless furnish more honey than any other genus of plants. The best clover honey region in the U. S. A. lies in western Vermont, northern and central New York, northwestern Ohio, northern Indiana, and Illinois, Michigan, Wisconsin, Minnesota, and northeastern Iowa. The quantity of nectar secreted varies enormously according to soils, climatic conditions, and other environmental factors. The chief blooming period of *Trifolium repens* begins in the spring about 5 or 6 weeks after the last killing frost and lasts 3-5 weeks. Nectar secretion is not uniform throughout the range of this species. The plants thrive best in localities with ample rains in July, August, and September. Abundant rain in May prolongs the period of blooming and of nectar secretion. White clover is a major source of honey only where the soils are calcareous and the average summer temperature not above 75°F. Secretion is most rapid under a considerable daily range temperature,—night temperature below 65°F. and day temperature above this point. *T. hybridum*, unlike white clover, is regularly cultivated as a farm crop. The conditions controlling nectar secretion are essentially the same as in white clover. *T. pratense* is losing ground as a farm crop because of the increasing deficiency of lime in the soils. It does not thrive in cold wet land. As is well known the flowers of red clover secrete nectar more freely than do those of white clover or alsike clover. Under normal conditions the floral tube of red clover is much longer than the tongue of the honey-bee. Honey is secured from the bloom only when the floral tubes are shortened by drought, or, owing to very favorable conditions of soil and climate, nectar is secreted so abundantly that it rises in the tubes until a part of it becomes accessible to the honey-bee.—Many beekeepers in this region are failing to obtain the full available honey crop because of deficiencies in their practice of bee culture. A system of management is given promising full crops.—J. H. Lovell.

4890. PHILLIPS, E. F., and G. S. DEMUTH. **Beekeeping in the tulip-tree region.** U. S. Dept. Agric. Farmers' Bull. 1222. 25 p., 6 fig. 1922.—A method is given for the management of apiaries to secure full honey crops from *Liriodendron tulipifera*. The tulip-tree region is restricted largely to Tennessee, Kentucky, the western portion of the Carolinas and Virginia, the Piedmont Plateau of Maryland, West Virginia and the Ohio River Valley. Although the bloom is a most dependable source of nectar, not much honey is at present secured from it (2.8 per cent of the total U. S. A. crop). The flowers open about 3 weeks after the average date of the last killing frost, and the blooming period lasts about 2 weeks. Trees begin to bloom when 15 years old. The honey is dark amber in color and has a strong flavor. Extracted honey alone should be produced from this source. Complete directions for the proper care of bees in this region are given.—J. H. Lovell.

4891. SCHMID, SEPP. **Beekeeping in Austria.** Amer. Bee Jour. 62: 512. Fig. 1. 1922.—Austria with a population of 6,400,000 and a territory of 32,000 square miles has about 60,000 beekeepers. In 1921, 350,000 colonies produced 1,320,000 pounds of honey, and 286,000 pounds

of wax. In the fine honey locations of Marchfeld, Under-Carinthia, and Burgenland 100 pounds of honey per colony is often obtained in good years.—The common honey plants are acacia, basswood, maples, brambles, esparcette, white clover, heather, buckwheat, and golden-rod.—*J. H. Lovell.*

4892. SHEPPARD, W. J. The Siberian yellow-flowered alfalfa. *Amer. Bee Jour.* 62: 420-421. 1922.—*Medicago falcata* is a good honey and forage plant, and well adapted to the dry belt of the interior of British Columbia.—*J. H. Lovell.*

4893. SHEPPARD, W. J. The spreading dogbane is a good honey plant. *Agric. Jour.* [British Columbia] 7: 252. 1923.—The honey from *Apocynum androsaemifolium* L. is water white and cannot be distinguished from that from fireweed by its color, but is better flavored and usually denser.—*J. W. Eastham.*

4894. SHEPPARD, W. J. The spreading dogbane is a good honey plant. *Amer. Bee Jour.* 62: 562-563. 1922.—[See preceding abstract.]

4895. SHEPPARD, W. J. Hairy vetch as a honey plant. *York's Bees and Honey* 3^o: 8-9. 1922.—In many orchards of British Columbia, *Vicia villosa* used as a cover crop is a good honey plant. The pale amber honey is secured in June and July.—*J. H. Lovell.*

4896. SHEPPARD, W. J. The hairy vetch as a honey plant. *Amer. Bee Jour.* 62: 455. 1922.—[See preceding abstract.]

4897. SMITH, B. F. Quality of honey influenced by soil. *Amer. Bee Jour.* 62: 31. 1922.

4898. SWENK, M. H. The honey regions and honey plant of Nebraska. *Amer. Bee Jour.* 62: 197-201. *Fig. 1-4.* 1922.—Nebraska is divided by the author into an eastern or white clover region and a western or alfalfa region. The dividing line runs irregularly through Holt, Boone, Garfield, Custer, Lincoln, and Hitchcock counties. East of this line the soil is loess, west of it sandy loams, or sand. The fertile loess is a comparatively moist soil, and the plants of this section are mesophytes or hydrophytes; on the sandy semi-arid western soils the plants are xerophytes. The annual rainfall in the eastern portion of the state ranges from 30 to 32 inches; in the western portion, from 12 to 15.—The chief sources of nectar in the eastern region are *Trifolium repens*, *Acer saccharinum*, *Taraxacum officinale*, *Robinia Pseudacacia*, *Gleditsia triacanthos*, *Catalpa speciosa*, *Asclepias syriaca*, *Brassica nigra*, *Cassia fasciculata*, *Helianthus annuus*, *Polygonum Persicaria*, and others. To the honey flora of the western region belong *Medicago sativa*, *Ribes setosa*, *Cleome scrullata*, *Cleomella angustifolia*, *Gaura coccinea*, *Oreocarya suffruticosa*, and many species of *Bidens*, *Aster*, *Solidago*, and *Helianthus*.—A number of honey plants are widely distributed throughout the state. Probably white sweet clover and yellow sweet clover yield a larger surplus than any other 2 species.—*J. H. Lovell.*

4899. VORGHESENI, G. A. R. L'ecologia vegetale e le sue applicazioni. [Vegetable ecology and its application.] *Riv. Biol. Rome.* 4: 521-534. 1 *pl.* 1922.

4900. WETMORE, A. Wild ducks and duck foods of the Bear River marshes, Utah. U. S. Dept. Agric. Bull. 936. 20 p., 4 *pl.* 1921.—Of foods attractive to 11 species of ducks found in the Bear River marshes, *Potamogeton pectinatus* and *Scirpus paludosus*, both occurring in abundance, furnish a large part of the vegetable portion. In all, 49 plants were available as duck foods.—*Julia M. Haber.*

4901. WILDER, J. J. Red bay as a honey plant. *Dixie Beekeeper* 4^o: 10. *Fig. 1-2.* 1922.—*Persea bordonia* grows in swamps near the coast from Virginia to Texas. The small flowers yield abundantly a very thick nectar from March to May. The honey is dark, strong in flavor, and is sold as grade No. 2. In the low Coastal Plains the honey never granulates although very thick.—*J. H. Lovell.*

4902. WILDER, J. J. St. Mary's River. Dixie Beekeeper 44: 4-6. Fig. 1. 1922.—The rich, swampy land along the river is covered with a dense growth of *Nyssa aquatica*, one of the best honey plants of this section, and *N. biflora*. *Serrenoa serulata*, *Acer rubrum* and *Ilex glabra* are also common. This territory would support an immense number of colonies of bees, and could be stocked either by land or water transportation.—J. H. Lovell.

4903. WINKLER, E. A. How Hubam clover increased my honey crop. Amer. Bee Jour. 62: 556. 1922.

4904. YOUNG, FLOYD D. Influence of cover crops on orchard temperatures. Monthly Weather Rev. 50: 521-526. Fig. 1-8. 1922.—A cover crop has little effect on temperature a few feet from the ground. Because of the shading there is a cooling effect upon the soil which tends to decrease the temperature and therefore to increase the possibility of frost.—E. N. Munns.

FOREST BOTANY AND FORESTRY

W. N. SPARHAWK, *Editor*

(See in this issue Entries 4863, 5135, 5142, 5154, 5236, 5240, 5266)

GENETICS

ORLAND E. WHITE, *Editor*

(See also in this issue Entries 4718, 4730, 4738, 4780, 4809, 4813, 4820, 4831, 4833, 4834, 4839, 4846, 4847, 4851, 4857, 4999, 5002, 5004, 5007, 5020, 5021, 5024, 5033, 5034, 5036, 5122, 5232)

4905. ANONYMOUS. Biological terminology. Nature 109: 733-736. 1922.—Scientific terms persist but their content requires continual readjustment. Vagueness occurs because biologists are not disciplined in methodology and the art of formulation. A term like "acquired character" is used by competent biologists in the same sense but it might be better to drop it in favor of some term like "somatic modification." Distinction between hereditary characters and modifications has been criticized. The relation between hereditary factors and environment is pointed out and the nature of new hereditary characters is discussed. The important point is not what terms are used but that biologists understand one another. Although inheritance depends upon factors, it is not necessary always to mention hereditary factors rather than hereditary characters. Concerning acquired characters more facts are needed and critical interpretation rather than discussion of terminology. The mistake of making an antithesis between "nature" and "nurture,"—2 components of 1 resultant—is not one to which a biologist can plead guilty.—Walter Scott Malloch.

4906. ÅKERMAN, Å. Beiträge zur Kenntnis der Speltoidmutationen des Weizens. I. Untersuchungen über eine Speltoidform aus schwedischem Sammetweizen. [Studies on speltoid mutations in wheat. I. Investigations on a speltoid form of Swedish velvet wheat.] Hereditas 4: 111-124. 2 fig. 1923.—An abnormal plant produced 9 offspring like the normal variety type, 4 like the abnormal parent plant, and 1 weak, small, bearded speltoid type plant. The 4 proved to be heterozygous and the 1 homozygous, with regard to the speltoid character. The homozygous speltoid type plant was shorter than the normal or heterozygote, and the head was more lax. With respect to shape, size, and pubescence of glume, and size and endosperm character of grain, the heterozygote form is between the normal and the speltoid. The heterozygote produced normals, heterozygotes, and speltoids in the ratio of 1.75 : 2.02 : 0.23 instead of the usual 1 : 2 : 1. This corresponds to Nilsson-Ehle's speltoid type A, the heterozygotes equalling the sum of the 2 homozygotes. This result is evidently brought about by the elimination of ♂ speltoid gametes. This is evidenced by certain crosses. Normal type ♀ × heterozygote ♂ produced 126 normals and 22 heterozygotes. The reciprocal cross gave the normal ratio of 1 : 1. It is assumed further that the amount of ♂ gamete

elimination is a variable factor directly correlated with the vitality of the speltoid soma. A variant heterozygote speltoid is described corresponding to Nilsson-Ehle's type B with a ratio of normals to heterozygotes of approximately 1:3 with only an occasional homozygous bearded speltoid appearing. This arose in this experiment from a plant of type A, already described.—*L. R. Waldron.*

4907. APPEL, O. Über die Anfälligkeit und Widerstandsfähigkeit verschiedener Kartoffelsorten gegen Krebs. [Susceptibility and resistance of different potato varieties to wart.] Arbeit. Ges. Förderung Baues u. Verwendung Kartoffeln 15. 19 p., 1 pl. 1918.—The author recalls the unpromising results of soil treatment for protection against wart and emphasizes the value of resistant varieties. His summary of varieties tested shows many more susceptible than immune. No connection is evident between time needed for maturing and susceptibility. Experiments point to inheritance of susceptibility. The hybrid character of potato stocks makes genetical interpretation difficult. A study of varietal pedigrees reveals such facts as the following: of 6 varieties descended from the crossing of Jubel and Deutsches Reich 4 were more or less resistant and 2 susceptible. Jubel is wart-resistant while the reaction of the other parent is unknown. Hindenburg (resistant) and Laurus (susceptible) arose from Jubel and 2 susceptible varieties as parents. Fürst Bismarck (susceptible) has given rise to 2 named resistant varieties, the other parents of which were untested. An extensive list of potato varieties is given in which the varieties are grouped into non-susceptible, slightly susceptible, strongly susceptible, and very strongly susceptible.—*J. P. Kelly.*

4908. BAILEY, VERNON. Beaver farming. Jour. Heredity 13: 215-218. 5 fig. 1922. [1923].—This is an untouched field of investigation, and great diversity exists in the various wild races of beavers.—*R. C. Cook.*

4909. BECKER, J. Über vegetative Bastardspaltung. [Somatic or vegetative segregation.] Zeitschr. Pflanzenzücht. 8: 402-420. 2 fig. 1922.—Somatic modification of factors is apparent only when the changed cell becomes the mother cell of a lateral bud, flower, leaf, etc. The writer believes it occurs many times but remains hidden. Vegetative segregation has been observed in carnations, snapdragons, tulips, wheat, poppy, dahlia, *Vicia villosa*, lupine, peas, beans, barley, oats, azalea, Pelargonium, asters, *Scabiosa*, *Dianthus*, *Pelunia*, *Campanula*, *Aquilegia*, *Verbena*, and some fruits such as pears, grapes and tomatoes.—Fruwirth was the earliest worker in the field; E. v. Tschermak and Baur also report somatic segregation. It is variously regarded as mutation, bud variation, and xenia. Becker's classification shows all gradations from recessive to dominant occurring in cases of somatic segregation.—Intensified environmental conditions are reported as causing somatic segregation or mutations. Becker attributes all cases fundamentally to an unequal division of the nucleus.—*Helen D. Hill.*

4910. BLUHM, AGNES. German rev. of: KOSTITSH, ALEXANDRE. (1) Sur la dissociation de la glande séminale et de la glande interstitielle déterminée par l'alcoolisme expérimental. Stérilité sans impuissance. (The dissociation of the seminal gland and the interstitial gland caused by experimental alcoholism. Sterility without impotence.) Compt. Rend. Soc. Biol. 84: 569-571. 1921. (2) Sur l'involution du processus spermatogénétique provoquée par l'alcoolisme expérimental. (The involution of the spermatogenetic processes provoked by experimental alcoholism.) Ibid. 84: 674. 1921.] Arch. f. Rass.- u. Ges. Biol. 14: 188. 1922.

4911. BLUHM, AGNES. [German rev. of: MACDOWELL, E. CARLETON. (1) Alcohol and white rats. A study of fertility. Proc. Soc. Exp. Biol. and Med. 19: 69-71. 1921. (2) The action of alcohol upon germinal material. [Abstract.] Anat. Rec. 23: 92. 1922 (see Bot. Absts. 11, Entry 1393).] Arch. Rass.- u. Ges. Biol. 14: 357-360. 1922.

4912. BLUHM, AGNES. [German rev. of: PEARL R. The experimental modification of germ-cells. Jour. Exp. Zool. 22: 125-186, 241-310. 1917.] Arch. Rass.- u. Ges. Biol. 14: 355-356. 1922.

4913. BONNIER, GERT. **Studies on high and low non-disjunction in *Drosophila melanogaster*.** *Hereditas* 4: 81-110. 2 fig. 1923.—Bridges had found that females having 1 Y and 2 X chromosomes give exceptions to the usual scheme of sex linkage, owing to synapsis of an X with the Y and subsequent non-disjunction of the 2 X's, in about 4 per cent of the reduction divisions, but in 1 such non-disjunctional line he found the XXY females to give 21 per cent of exceptions. Bonnier finds that the high per cent of X-Y synapsis in this line depends upon something that must be present in both the X chromosomes of the XXY female of the "high line," and not upon anything elsewhere located, since XXY descendants of outcrosses of the high line, which had received 1 of their X's from another line, always showed the low percentage, whereas XXY descendants which had received both X's from the high line but often the Y and some autosomal material from other lines invariably showed the high percentage. When, through outcrosses involving crossing-over, XXY flies were made up in which only the left ends of the X chromosomes of the high line were represented in both of their X's (neglecting whatever derivative of the high line might be present in only 1 of the X's), an intermediate proportion of exceptions (8 to 13 per cent) was obtained; in 1 such case only that portion of both X's to the left of cut (locus about 20) was derived from the high line. When only the right end of both X's came from the high line (in an extreme case only a part to the right of vermilion, locus 33), there was also an intermediate per cent—10.6 to 15.5. Therefore, the high original per cent (21) is not dependent on 1 pair of genes, but either on 2 or more,—or, as Bonnier believes, on some peculiarity of the entire length of the chromosome, resident in what he calls the "genebasis" in distinction to the genes themselves. On this hypothesis the length of "genebasis" ("z"), common to both chromosomes, that was derived from the high line, determines the percentage of exceptions ("y"). Bonnier calculates that, accepting this supposition and taking his data at their face value, and neglecting the great variability in percentage between different supposedly genetically identical cultures, the following empirical formula holds: $y = 4.3 + 0.2 z$.—H. J. Muller.

4914. BREITENBECHER, J. K. **Hereditary shortness of thumbs.** *Jour. Heredity* 14: 15-22. 5 fig. 1923.—Hereditary shortness of thumbs is a unique human abnormality, not previously described, discovered about 10 years ago. The abnormal trait is associated with a long narrow hand; but the most evident feature is a thick, short, broad thumb. Briefly, the abnormal thumb is shorter than the normal by the length of the 1st phalanx. In the family under observation the writer traced this abnormal thumb through 5 generations, 13 members having it. The character is neither sex-limited nor sex-linked in its transmission. The evidence proves that it is an autosomal Mendelian dominant.—J. K. Breitenbecher.

4915. BROWN, W. R. **Pusht-i-Kuh \times Hashtnagari sheep at the agricultural experiment station, Peshawar.** *Agric. Jour. India* 17: 264-270. 3 pl. 1922.—The author describes the results of crosses made in the Northwest Frontier Province of India between a Pusht-i-Kuh or long-wooled Persian ram, obtained on the Tigris, with native ewes of a closely similar breed, the Hashtnagari. Efforts to make matings with fat tailed Peshawari ewes were unsuccessful. Both the Pusht-i-Kuh and the Hashtnagari are fat tailed sheep but the former has a much broader and more massive tail. Both carry a heavy fleece of good carpet wool quality. The Pusht-i-Kuh is a much heavier sheep. The crossbreds showed marked improvement in rate of maturity, in live and dead weight, and in the quality and weight of the fleece. The rams exceed even the Pusht-i-Kuh in weight and constitution. It is suggested that this is an effect of crossing.—Sewall Wright.

4916. COLE, LEON J., and DEWEY G. STEELE. **A waltzing rabbit.** *Jour. Heredity* 13: 290-294. 1 fig. 1922 [1923].—A rabbit which exhibited circular movements similar to those of waltzing mice and rats occurred among the descendants of males treated experimentally with lead and with alcohol. Several other nervously defective individuals cropped out in the same line of descent, and it is possible that all may have been induced by the effects of the poisoning on the germ plasm. Simple Mendelian inheritance of the waltzing behavior, as it occurs in mice, could not be demonstrated in the rabbit.—L. J. Cole.

4917. COLIN, HENRI, et Y. TROUARD-RIOLLE. *Dissociation de l'hybride: orge noire à barbes lisses* × *orge Albert*. [Hybrid segregation: Black Bearded Barley × Albert.] *Compt. Rend. Acad. Sci. Paris* 176: 854-856. 1923.—A black barley with awns smooth except at the extremity was pollinated by Albert, a homozygous, white, rough-awned barley. Of the 20 "hybrid" kernels secured, 14 were germinated. Black kernel color is dominant, though many less well developed kernels are merely grayish and the awns range all the way from black to white. The authors report that the F_1 population includes smooth-awned, rough-awned, and intermediate forms and that smooth-awned F_1 plants gave rise to only smooth-awned F_2 plants. The rough-awned plants are reported to have a segregating F_2 progeny, but no numerical data are given for the segregating classes. The authors claim that "disjunction of characters" occurred in F_1 , without mentioning the possibility of self pollination.—*Kwen S. Hor.*

4918. COLLINS, J. L. *Culture of Crepis for genetic investigations*. *Jour. Heredity* 13: 329-336. 4 fig. 1922 [1923].—The paper describes cultural and hybridization methods used in studying inheritance in a genus of the Compositae. Achenes may be sprouted in shallow pans of sterilized soil or in a glass jar-moist chamber germinator. Advantages of each are given. Achenes may be sterilized with formaldehyde vapor or a solution of calcium hypochlorite to prevent growth of injurious fungi. The young seedlings are sub-irrigated in pots. Hybridization is accomplished by removing fresh pollen from the pistil with a fine jet of water; also by emasculation. Tools necessary for emasculation are described. Anthesis of the flowers occurs at regular periods of the day. Methods of securing seed from sterile and fertile strains and of protecting plants from parasitic organisms are given.—*J. L. Collins.*

4919. CREW, F. A. E. *A black Leghorn hen which turned white*. *Jour. Heredity* 13: 299-303. 4 fig. 1922 [1923].—A Black Leghorn hen ceased laying and developed head characters like those of the male; the plumage remained hen-like in type but with each successive moult became whiter until the bird was white with black flecks. She died from internal hemorrhage. A large tumor containing abundant luteal cells replaced the ovary. The conclusion is that the formation of large quantities of pigment in the luteal cells is a sign of degeneration, the final stage of which is a structureless mass of pigment lying among the stroma. In this case the cells were almost functionless and had the bird lived she would probably have become cock-feathered. The adrenals could not be found and it is thought they became incorporated in the tumor-growth; this may explain the changes in pigmentation. It must be noted that in the young fowl ovarian and adrenal tissues are histologically continuous.—*F. A. E. Crew.*

4920. CUNNINGHAM, J. T. *Species and adaptation*. *Nature* 109: 775-777. 1922.—The author criticizes Bateson's address at Toronto [see Bot. Absts. 11, Entry 3806].—*P. C. Mangelsdorf.*

4921. DANIEL, LUCIEN. *Variations des parfumes sous l'influence du greffage*. [Variations in perfume through the influence of grafting.] *Compt. Rend. Acad. Sci. Paris* 176: 999-1001. 1923.—The author obtained morphological and biochemical variations in grafted plants possessing odorous products. A variable type of *Artemis absinthium*, induced by such grafting, produced a seedling which in turn furnished plants which varied morphologically as well as in odor and flavor.—*Richard Wellington.*

4922. DUNN, L. C. *Color inheritance in fowls*. *Jour. Heredity* 14: 23-32. 4 fig. 1923.—Detailed evidence illustrated by photographs is presented on the inheritance of plumage color and pattern in crosses of Columbian pattern (Light Brahma) fowls with black and with buff fowls. The Columbian is found to differ from the buff coloration by a single dominant sex-linked gene which inhibits the development of buff pigment in the feathers and by multiple genes affecting the amount of black pigment in certain parts of the plumage. The Columbian coloration is found to differ from self black by 2 main genes,—the sex-linked gene for inhibition

of buff (present in Columbians, absent in blacks) and a dominant autosomal gene for extension of black to all or nearly all of the plumage (present in blacks, absent in Columbians).—*L. C. Dunn.*

4923. FEDERLEY, HARRY. Bilden Chromosomenkonjugation, Mendelspaltung und Fertilität bei Speziesbastarden einen Dreibund? [Does chromosome conjugation, Mendelian segregation and fertility in species hybrids form a triple alliance?] *Hereditas* 4: 161-170. 1 fig. 1923.—“Non-conjugation of the chromosomes in the gametogenesis of species hybrids results in partial or total sterility in F_1 , and non-segregation in F_2 and in back-crosses. In the species hybrid *Chaerocampa porcellus* ♀ × *Ch. elpinor* ♂ [hawk-moths], all the 29 *porcellus*-chromosomes conjugate with the 29 *elpinor*-chromosomes both in the spermatogenesis and in the oogenesis. In this case fertility in F_1 and segregation in F_2 and in back-crosses is consequently to be expected.” The F_1 , for a species-hybrid, is remarkably fertile. Difficulty in making a mating to produce F_2 arose from the fact that the 15 females acquired full development within 2 weeks, while the males matured much more slowly. Two males were carried to maturity in 4 weeks, the 7 others wintered over. Only 1 mating was obtained, and from it only 11 eggs, of which 5 hatched, all dying as caterpillars. The overwintering males eclosed earlier than the parent species, but a mating with a *porcellus* ♀ was brought about. All of the 38 eggs then laid hatched but, though apparently structurally normal, only 7 larvae would eat (*Epilobium angustifolium*), and all except 1 female died before pupation. Hybrid viability depends not only on successful conjugation of chromosomes but also upon other unknown conditions.—The horn of the young larva of *elpinor* is long and dark; that of *porcellus* is a raised wart. The F_1 was like *elpinor*, and the 5 F_2 caterpillars likewise had the horn, but no segregation occurs, for the 38 larvae of the back-cross (*porcellus* ♀ × F_1 ♂) all have the *porcellus*-like small cone.—*J. H. Gerould.*

4924. FEHLINGER, H. Geschlechtsverhältnis der Geborenen und Alter der Eltern in der Stadt Amsterdam. [Sex ratio of births and age of parents in Amsterdam.] [German rev. of: *Statistisch Jahrb. d. Stadt Amsterdam*, 1917. (Statistical year book of the city of Amsterdam, 1917.)] *Arch. Rass.- u. Ges. Biol.* 14: 230-231. 1922.

4925. FETSCHER. [German rev. of: WEIL, A. *Die innere Sekretion*. (The internal secretion.) 140 p., 35 fig. Julius Springer: Berlin, 1921.] *Arch. Rass.- u. Ges. Biol.* 14: 186-187. 1922. [See also Bot. Absts. 11, Entry 3892; 12, Entry 4944.]

4926. FICK. Die Familie Fick. [The Fick family.] *Arch. Rass.- u. Ges. Biol.* 14: 159-175. 1922.—This paper describes the genealogical tree and special characteristics of the descendants of one Herman Fick, born 1702, in Oberfranken, Germany. In this family are found 6 persons of well-known ability, 7 unusually gifted but less gifted than the 6 first mentioned, 15 gifted more than the average, and 10 others, with more than average ability but who died before reaching full maturity, 4 of these being killed during the World War. The activities of some of those of distinguished ability are noted; also the activities of those of less exceptional ability, among them teachers, governesses, and 1 farmer. The description gives a complete picture of the activities of all the descendants in the 1 line traced through to the present date. The physical traits, such as general build, skin, and hair and eye color, are noted in many individuals. No attempt is made to analyse from any point of view the data presented. The plea is made that more genealogical-biographical studies be made of the aristogenic families of Germany.—*A. H. Estabrook.*

4927. FOLSOM, DONALD. Mutations of the potato. Two somewhat unstable leaf-form sports of the Irish potato. *Jour. Heredity* 14: 45-48. 3 fig. 1923.—One type of sport was originally observed only once, and the other type 4 times, in over 350,000 plants examined for foliage diseases. The former type, characterized by simple leaves, was followed through a series of 4 vegetative generations and in the 3rd generation reverted partly and temporarily to the compound-leaf norm. The latter type, characterized by thick, distorted, and glabrous leaves, was grown through 1 series of 5 vegetative generations, and frequently reverted in part to the norm.—*Donald Folsom.*

4928. FRANZ, V. [German rev. of: BECHER, SIEGFRIED. *Flügefärbung der Kolibris und geschlechtliche Zuchtwahl*. (Wing color of humming birds and sexual selection.) Anat. Hef 57: 447-482. 1919.] Arch. Rass.- u. Ges. Biol. 14: 180-181. 1922.

4929. FRANZ, V. [German rev. of: LEHMANN, ERNST. *Variabilität und Blütenmorphologie*. (Variability and flower morphology.) Biol. Zentralbl. 38: 1-38. 1918 (see Bot. Absts. 7, Entry 1796).] Arch. Rass.- u. Ges. Biol. 14: 346-347. 1922.

4930. FRANZ, V. [German rev. of: LUBOSCH, W. *Der Akademiestriet zwischen Geoffroy St.-Hillaire und Cuvier im Jahre 1830 und seine leitenden Gedanken*. (The debate between Geoffroy St.-Hillaire and Cuvier in 1830 and its main issues.) Biol. Zentralbl. 38: 357-384, 397-455. 1918.] Arch. Rass.- u. Ges. Biol. 14: 345. 1922.

4931. FRETS, G. P. *The index cephalicus*. *Genetica* 4: 481-534. 1922.—Original statistical data are given for the head index of 3,600 persons, gathered from patients and visitors at the Asylum Maasoord of Rotterdam, and also from field trips from the institution. The author's data are compared with these of Galton and others, citing their results. He studied the movement of growth of the head in children, showing that the head index of children changes little during growth.—Summary of findings: (1) variability of head index with men is larger than with women; (2) index of male is lower than that of the female, of brothers lower than sisters; (3) among the low indices there are more males than females, among the high indices there are more females than males; (4) the variability of head-length and head-breadth is larger for the male than for the female; (5) probably the skew curve of frequency of distribution for the index fits better for the author's and the Swedish material of Retzius than the normal curve does.—The author considers that his data show "that the index cephalicus is a characteristic which has a racial and sexual element as a basis and alterations of this take place according to the law of compensational growth, in its effect varying for different capacities of the head." The rule for compensational growth is that alterations of the form of the head take place by an increase or decrease of each of the 3 dimensions of the head in a correlated proportion. Tables giving lengths and breadths with head capacities, taken from Tocher, are shown to demonstrate this compensational growth. Effects of compensational growth are not always the same; in the case of large heads, with an increase of breadth, the height decreases rather than the length shortening, and in the case of small heads, a growing shorter is accompanied by less length rather than by less height.—A. H. Estabrook.

4932. FRUWIRTH, C. *Handbuch der landwirtschaftlichen Pflanzenzüchtung*. 4. neu-bearb. Aufl. Bd. 3. *Die Züchtung von Kartoffel, Erdbirne, Lein, Hanf, Tabak, Hopfen, Buchweizen, Hülsenfruchtern und kleeartigen Futterpflanzen*. [Handbook of agricultural plant breeding. 4th rev. ed. Vol. 3. Breeding of potatoes, Jerusalem artichoke, flax, hemp, tobacco, hops, buckwheat, leguminous fodder plants.] xvi + 227 p., 45 fig. Paul Parey: Berlin, 1922.—This edition covers the literature of the subject up to the spring of 1921 [see Bot. Absts. 6, Entry 1670]. Extensive changes appear in the chapter on hybridization of peas and beans and some revision in the chapters on potatoes, hemp, flax, and red clover. Recent researches by the author on potatoes, hemp, buckwheat, and leguminous forage plants are included.—L. A. Waitzinger.

4933. GOWEN, MARIE S., and JOHN W. GOWEN. *Studies in milk secretion*. XVII. *Relation between milk yields and butter-fat percentages of the 7 day and 365 day tests, of Holstein-Friesian advanced registry cattle*. Maine Agric. Exp. Sta. Bull. 306. 21-60. 1922.—The authors find a correlation of +.660 as the weighted average of correlations between different 365-day milk yields among advanced registry Holstein-Friesian cows. The correlation between a 7-day milk yield and 365-day milk yield of the same lactation is +.598. That between 7-day milk yield and 365-day milk yield of a different lactation is +.462. The corresponding correlations dealing with butter fat percentage were +.715, +.531, and +.423

respectively. All of the regressions were fairly close to linear. Linear prediction formulae are given for various age groups. The analysis indicates no changes in recent years in the correlations which would tend to corroborate the common view that recent discoveries of methods of manipulating feeding and care for the 7-day test have vitiated its value. It is concluded that the 7-day test gives a valuable indication of the potential milk yield and butter-fat percentage of Holstein-Friesian cows although less valuable than a 365-day test.—*Sevall Wright*.

4934. GUILLAUMIN, A. **Les Phalaenopsis cultivés et leurs hybrides.** [The cultivated Phalaenopsis and their hybrids.] *Rev. Hort.* 95: 316-318. 1923.—The cultivated Phalaenopsis and their introduction are noted. Numerous hybrids are mentioned with brief statements as to origin.—*Richard Wellington*.

4935. HARLAN, HARRY V., and MERRIT N. POPE. **Many-noded dwarf barley.** *Jour. Heredity* 12: 269-273. 3 fig. 1922.—A barley plant having a large number of leaves and extremely short internodes was found in an agricultural variety of *Hordeum distichon nudum*. One seed from this plant was germinated in the greenhouse and produced a greatly modified plant somewhat taller than the parent, which was about 50 cm. from crown to tip of awns. Two seeds from this plant produced many-noded dwarf plants about 50 cm. tall. Hybrids of the dwarf strain were made successfully with 4 other varieties of barley. No "dwarf" characteristics were found in the F_1 , but in the F_2 segregation occurred in a ratio of approximately 3 normals to 1 dwarf. The most plausible explanation of the appearance of this dwarf is that it is a mutation.—*R. C. Cook*.

4936. HARLAN, HARRY V., and MERRITT N. POPE. **The use and value of back-crosses in small-grain breeding.** *Jour. Heredity* 13: 319-322. 1922 [1923].—Back-crossing has long been used to fix desired characters in animal breeding, but has not been so widely used in plant breeding, even when the plants used are self-fertilized and therefore immune to the evil effects of the method. An account is given of an experiment to produce smooth-awned barley by back-crossing which has so far given very promising results. In this case all the characters except the smooth awns are desired from 1 parent, and only the smooth awns from the other. Assuming only 20 factors, and no linkage, there would be 1 chance in 1,048,576 that the 20 desired characters would be found in any 1 segregate, and 1 chance in 4 that this segregate would be smooth-awned. It obviously would be impossible to grow such a generation. On the other hand, by back-crossing there would be a rapid elimination of the undesirable characters. The number of plants necessary would be much less, and the chances of finding the desirable one proportionally greater.—*R. C. Cook*.

4937. HERWERDEN, M. A. VAN. [Dutch rev. of: WESZECSKY, O., und F. VERZAR. **Rassenbiologische Untersuchungen mittels Iso-hämagglutininen.** (Racial-biological investigations with iso-haemagglutinins.) *Biochem. Zeitschr.* 26: 33-39. 1921.] *Genetica* 4: 479-480. 1922.

4938. HIRSCH. [German rev. of: WOLTERECK, R. **Variation und Artbildung. Analytische und experimentelle Untersuchungen an pelagischen Daphniden und anderen Cladoceren.** I. Morphologische, entwicklungsgeschichtliche und physiologische Variations-Analyse. (Variation and species formation. Analytical and experimental investigations on pelagic Daphnids and other Cladocerans. I. Morphological, developmental, and physiological analysis of variations.) 145 p., 6 pl., 55 fig. Francke: Bern, 1919.] *Arch. Rass.-u. Ges. Biol.* 14: 179-180. 1922.

4939. HUXLEY, JULIAN. **Glands and development; amphibian metamorphosis considered as consecutive dimorphism controlled by the glands of internal secretion.** *Jour. Heredity* 13: 349-358, 1922; 14: 3-11. 8 fig. 1923.—The essence of metamorphosis is the rapid passage from one form to another during the life history. This morphological change in all cases hitherto

investigated is associated with a physiological change. This in amphibia is concerned with the thyroid, in insects with N-metabolism.—Similar morphological and physiological changes are seen in protandric and protogynous hermaphrodites, and in the type of intersexuality (consecutive) seen in Goldschmidt's moths, produced by crossing geographical races of *Lymantria*. All are cases of consecutive dimorphism.—Why do different *Anuras* require different times to reach metamorphosis? How is it that the limbs react differently to thyroid treatment in *Anura* and *Urodela*? Why do *Necturus* and other perenibrachiates fail to metamorphose even after thyroid treatment? One is driven to believe (1) that the relative rate of thyroid growth varies in different species, metamorphosis occurring only after a certain relative concentration occurs in the blood. (2) That different tissues of the organism are "sensitized" differently to the thyroid hormone, some (e.g., limbs of *Anura*) reacting to it by (a) increased growth, others (e.g., Anuran tail) by (b) breakdown; still others are unaffected (e.g., lung). This probably implies that the different tissues are adapted to different optima of metabolic rate. (3) That the same tissue may be sensitized differently in different species. Attention is drawn to the importance of the study of relative rates of processes for a proper understanding of the physiology of development.—*J. Huxley*.

4940. JENKINS, M. T. A new method of self-pollinating corn. Jour. Heredity 14: 41-44. 2 fig. 1923.—A modified technique for self-pollinating corn is described which is considered more rapid and as safe as older methods. The tassel is pulled and enclosed with the shoot in a 12-pound paper bag. To keep the tassel shedding, its stem is inserted in a small bottle of water attached to the stalk.—*M. T. Jenkins*.

4941. JOHANNSEN, W. Some remarks about units in heredity. Hereditas 4: 133-141. 1923.—Relationships of many terms used in genetics are discussed and the inadequacy of some pointed out; "unit-character," particularly, is one that should be "exterminated." The author suggests that the so-called experimentally demonstrated units are nothing more than expressions for local deviations from the original ("normal") constitutional state in the chromosome; that the whole of Mendelism is "perhaps nothing but an establishment of very many chromosomal irregularities, disturbances or diseases of enormously practical and theoretical importance but without deeper value for an understanding of the 'normal' constitution of natural biotypes."—*Merle C. Coulter*.

4942. KAJANUS, BIRGER. Über Ährchenabstand und Ährchenzahl bei Nachkommen-schaften von Speltoid-Heterozygoten. [Internode length of spikes and number of spikelets in the descendants of speltoid heterozygotes.] Hereditas 4: 10-16. 1923.—In progenies of a cross between 2 common wheats, heterozygous speltoid plants showed almost uniformly greater internode length and fewer spikelets than shown by the *vulgare* plants. Homozygous speltoid plants showed these modifications over both normal and heterozygous plants but in a less pronounced manner. In progenies of a cross between a common wheat and a speltoid type the above facts were established even more clearly. The observed differences are certainly genetical in part but probably due partly to environmental conditions.—*L. R. Waldron*.

4943. KELLY, J. P. *Astylis* Phlox; the relation of this variation in Phlox Drummondii to the large-eyed flower. Jour. Heredity 13: 338-342. 5 fig. 1922 [1923].—In cultures of Drummond's phlox plants with exceptionally small ruffled and styleless flowers occurred; they set no seed although pollen was abundant. This type was named *astylis*; crossed with normals it gave normal progeny. Inbreeding F_1 plants led to a segregation in F_2 of about $\frac{1}{4}$ *astylis*, indicating a unifactorial difference. It was discovered that *astylis* crossed to colored types with small white eyes led to the large-eyed colored types named in commercial circles, *orbicularis*. *Orbicularis* plants always split when inbred into about 25 per cent *astylis*, 50 per cent *orbicularis*, and 25 per cent small-eyed plants.—*J. P. Kelly*.

4944. KOEHLER, O. [German rev. of: WEIL, A. Die innere Sekretion. Eine Einführung für Studierende und Ärzte. (The internal secretion. An introductory text for students and physicians.) 140 p., 35 fig. Julius Springer: Berlin, 1921.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 136-138. 1922. [See also Bot. Absts. 11, Entry 3892; 12, Entry 4925.]

4945. КОЗО-ПОЛЯНСКИЙ, Б. М. [Kozot-Poljanski, B. M.] **Финад Зводюни.** [The finale of evolution.] Буревестник Краснояра [Burevestnik Krasnodar] 24 p. Советской Типографии Кусчердоияграотреста [Soviet Printing Presses]: Woronesh, 1922.—A cardinal cause is the interference of man after his emigration from the Pacific continent.—B. M. Kozot-Poljanski.

4946. LÉCAILLON, A. Sur la fécondité des hybrides obtenus par le croisement du Cunard Pilet mâle (*Dafla acuta* L.) et du Cunard sauvage femelle (*Anas boschas* L.). [Fertility of hybrids obtained through crossing a male pintail duck with a female wild duck.] Compt. Rend. Acad. Sci. Paris 174: 1431-1433. 1922.—The hybrids resulting from the crossing of different species of ducks are usually sterile. Those from the mating of a pintail male with a wild female are an exception. In the Toulouse zoological gardens 3 such hybrids have been obtained. A hybrid male mated to a wild female has produced 12 offspring. Young have been obtained when the latter were mated *inter se*.—H. W. Feldman.

4947. LILLIE, F. R., and K. F. BASCOM. An early stage of the free-martin and the parallel history of the interstitial cells. Science 55: 624-625. 1922.—The sex differentiation in the female of cattle before birth is due to genetic factors, while in the male the genetic factors are intensified by the production of a hormone. The interstitial cells appear in the testis of a calf embryo by the time it is 3 cm. long. The interstitial cells secrete the sex hormone, which, circulating in the blood, inhibits the growth of the entire female gonad. The interstitial cells in the gonads of female calves do not appear until about the time of birth; so that the deleterious effect of the male hormone can not be counteracted in the early stages.—W. S. Anderson.

4948. MANGELSDORF, P. C. Heritable characters of maize. XII.—Mealy endosperm. Jour. Heredity 13: 359-365. 4 fig. 1922 [1923].—Mealy endosperm is a type of defective seed in which the corneous endosperm does not develop normally. The character is inherited as a simple recessive. The strain has been crossed with other defectives and found to be distinct. The factor for mealy is linked with a factor for albino seedlings.—P. C. Mangelsdorf.

4949. MELLON, RALPH R. Observations on the origin of biotypes (variants) in pure lines of bacteria. [Abstract.] Absts. Bact. 7: 18. 1923.—Variability in *Bacillus* sp. is identified with the pleomorphic cycle. "Pleomorphism for this form is regarded as a true life cycle and and in reality represents potential variation."—D. Reddick.

4950. MENDIOLA, NEMESIO B., and J. M. CAPINPIN. Breeding ornamental Hibiscus. Philippine Agric. 11: 217-230. 2 pl. 1923.—Species and varieties of *Hibiscus* grown in the Philippines are briefly described and the variability of certain characteristics noted. Methods of improvement by breeding and selection, and propagation methods are discussed. Brief descriptions are given of numerous seedlings produced from parents of unknown purity.—Richard Wellington.

4951. MINER, JOHN RICE. The probable error of the vital index of a population. Proc. Nation. Acad. Sci. [U. S. A.] 8: 106-108. 1922.—The author derives the formula for the probable error of the birth-death ratio or vital index for use in estimating the significance of differences in this index in different communities. Letting B = number of births in a year and D = number of deaths in a year, he obtains the approximate formula $PE \left\{ \frac{100 B}{D} \right\} = 67.449 \frac{B}{D} \sqrt{\frac{1}{B} + \frac{1}{D}}$. A more complex formula, which involves slightly less approximation but requires knowledge of the population of the community, is also given.—Sewall Wright.

4952. MIYAKE, KIICHI, and YOSHITAKA IMAI. Genetic studies in the opium poppy (*Papaver somniferum* L.). I. On the flower color. Bot. Mag. Tokyo 37: (1)-(13). 1 fig. 1923. [In Japanese.]—The chief results obtained are as follows: (1) The allelomorphs investigated

are the following 5: R, r ; in the presence of the subsequent D factor, R is responsible for the red flower, and its recessive mate, r , represents purple flower. The flower color of the hybrid is dark red, being almost intermediate between both zygotes.— D, d ; these allelomorphs are responsible for the eye color of the flower, i.e., either purple of white. The R factor working with double d produces red flower with white center, but the flower remains colorless in its double recessive combination.— I, i ; this dominant factor changes white centered red flower into white, acting as an inhibition to the colored.— S, s ; the former is responsible in producing the "Sakura" flower, and the s s-composition represents a recessive white flower.— H, h , the dominant factor acts as an inhibitor to "Sakura," changing the flower color into white. (2) There are 2 kinds of white flower, i.e., the dominant and the recessive to every white-centered red and "Sakura" flower. (3) A linkage of high intensity was found between the r and i factors."—*Kiichi Miyake and Yoshitaka Imai*.

4953. MOHR, OTTO L. A somatic mutation in the singed locus of the X-chromosome in *Drosophila melanogaster*. *Hereditas* 4: 142-160. 3 fig. 1923.—The article describes a striking case of a mosaic male, the left half of which, except head, had singed hairs and bristles; adjoining portion of right dorsal side of thorax and small adjoining portion of right side of head was also singed, the line of demarcation between singed and normal being clear everywhere. The singed had arisen by mutation as the composition of the fly in other respects was tested and found to conform to expectation based on its supposed parents, which were of non-singed stock. The germinal tissue also was mosaic, for about $\frac{1}{2}$ the sperm transmitted singed and $\frac{1}{2}$ transmitted normal hairs. Hence the mutation occurred in a nucleus of an early cleavage (2-cell?) stage, and this nucleus must have been destined to give rise both to part of the germinal and part of the somatic tissue, contrary to the condition found by Morgan and Bridges in their gynandromorphs. Identity of locus of the new singed (s_n) with the old was proved by crosses with the old and by its linkage with other genes. It is a different allelomorph, however, since the homozygous female lays fertile, normal-appearing eggs, unlike the female homozygous for the original singed gene. "Compound" females, having both an "old" and a "new" singed gene, also lay fertile, normal-appearing eggs.—*H. J. Muller*.

4954. NAGAI, ISABURO. Notes on the species hybrids in the genus *Mosla*. Japanese Jour. Bot. 1: 93-104. 2 pl. 1923.—At least 7 species of the genus *Mosla* are known at present: *M. Orthodon*, *M. Hadai*, and *M. punctata* are closely allied to each other, while *M. punctata* and *M. grosseserrata* are distinct species. The F_1 hybrids between *M. Orthodon* and *M. punctata* and between *M. leucantha* and *M. punctata* are completely sterile; some of the characters resemble one parent, some the other, while the remainder are intermediate. The F_1 hybrid between *M. leucantha* and *M. Orthodon* bore purple flowers like *M. Orthodon* and in F_2 the plants segregated into a ratio of 1 purple:2 tinged:1 white. Population also segregated into a 1:2:1 ratio for branching habit. A natural F_1 hybrid between *M. grosseserrata* and *M. punctata* was sterile and more nearly resembled *M. punctata* although traces of *M. grosseserrata* were present. *M. Orthodon* produces thymol while *M. Hadai* produces the isomer carvacrol but no thymol. In morphological characters the F_1 resembles pure *M. Hadai* except in branching habit in which it resembles *M. Orthodon*. In F_2 segregation takes place in a number of characters giving rise to new forms. A ratio of 15 normal and half-dwarfs to 1 dwarf was obtained and other segregants occurred. Selection was effective in later generations in raising the percentage of oil over that of either parent. To measure the degree of resemblance of hybrids to parental species the author uses the formulae: $Rp = \frac{1}{n} \times p$, $Rm = \frac{1}{n} \times m$, $Rpm = \frac{1}{n} \times pm$, where R = degree of resemblance, n = total number of characters examined, p = number of paternal characters, m = number of maternal characters, pm = number of intermediate characters. He used $Rp + Rm$ as a measure of heterogeneity, and $Rp - Rm$ as a measure of dominancy.—*Walter Scott Malloch*.

4955. NIRODY, B. S. Investigations in avocado breeding. California Avocado Assoc. Ann. Rept. 1921-22: 65-78. 4 fig. 1922.—The author discusses the 3 groups or "races" and

some leading commercial varieties of avocado, especially as to their horticultural merits and demerits, and lists qualities desirable in commercial varieties. Promising combinations of varieties with which crossing was attempted are listed and discussed. A tabular statement gives the time of day at which the flowers of various varieties open, shed their pollen, and close, and another lists pairs of varieties suitable for interplanting, selected on the basis of season of blooming and daily time of shedding pollen. The special technique of avocado cross-pollination is described.—*Howard B. Frost.*

4956. OSBURN, R. C. Some common misconceptions of evolution. *Ohio Jour. Sci.* 22: 173-192. 1922.

4957. POLL, H. [German rev. of: TENDELOO, N. PH. *Konstitutionspathologie und Erbllichkeit.* (Constitutional pathology and heredity.) 32 p. Julius Springer: Berlin, 1921.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 213-214. 1922.

4958. RASMUSON, HANS. Über die Rübenpfropfungen von Edler und einige neue ähnliche Versuche. [On Edler's beet grafts and several new experiments of similar character.] *Hereditas* 4: 1-9. 1923.—Edler found that sugar beet seedlings grafted on red beet and the latter grafted on sugar beet split up into different colors. He concluded that the segregation was due to the influence of the root stock. Rasmuson finds no color segregation and therefore concludes that the results obtained by the former investigator were due either to impure stock or to cross-fertilization.—*Richard Wellington.*

4959. ROSEN, DANIEL. Some remarks about the distance between the genes in *Drosophila melanogaster*. *Hereditas* 4: 231-234. 1923.—The author proposes that all "contiguous," linked genes dealt with may really be the same distance apart, the different per cents of separations observed between them being due not to different chromosome distances, as the chromosome maps seem to indicate, but to different frequencies of crossing over in the chromosome, caused by "different degrees of affinity" between the respective "contiguous" genes.—*H. J. Muller.*

4960. SAUNDERS, C. E., and G. G. MOE. Some observations on the inheritance of awns and hoods in barley. *Proc. and Trans. Roy. Soc. Canada III*, 16: 15-26. 6 pl. 1922.—Arlington barley is 6-rowed and as grown at Ottawa is not entirely awnless, the median floret carrying short awns. In 3 years out of 7 at Ottawa, Arlington developed winter type although spring sown. Time of sowing in the spring was not the determining factor in this respect. Arlington, used as ♀ parent, was crossed with (1) a 6-rowed bearded and hullless variety, (2) a 2-rowed hooded and hullless variety, and (3) a 2-rowed bearded and hulled variety. The ♂ parents were recent extractives but evidently nearly or quite homozygous. The F₁ plant of cross (1) showed intermediacy in regard to awns. In the F₂ generation segregation was of a simple 1:2:1 character in regard to beards. The numbers obtained were 44 plants like the ♂ parent, 67 plants like Arlington, and 114 intermediates; classification was difficult.—In cross (2) the F₁ plants were almost perfectly 6-rowed, 2-rowedness being recessive. Four phenotypes resulted in the F₂: I, 2-rowed, awnless, and hooded; II, 6-rowed or nearly so, awnless and hooded; III, 2-rowed, awned; IV, Arlington type, with lateral rows not always completely fertile. Phenotype I contained 2 genotypes: (A) hooded and homozygous, and (B) awnless and heterozygous producing I (A), I (B) and III. Phenotype II contained 4 genotypes: (A) homozygous 6-rowed, hooded; (B) heterozygous 6-rowed, producing II (A), II (B), and IV (A); (C) homozygous hooded but heterozygous 6-rowed, producing I (A), II (A), and II (C); and (D) heterozygous 6-rowed and awnless, producing representatives of the 9 genotypes. Phenotype III was simply genotypic and homozygous. Phenotype IV contained 2 genotypes: (A) Arlington type (homozygous) and (B) a heterozygous Arlington type producing III, IV (A) and IV (B). The F₂ plants rather roughly approximated a 3:9:1:3 ratio.—In cross (3) the F₁ plants were again almost completely 6-rowed. The F₂ showed 2 phenotypes: I, 2-rowed and awned, and II, like the F₁ plant. Two genotypes are found in II: (A) a heterozygous form and (B) a homozygous form apparently identical with Arlington. The F₂ plants only approximated a 1:3 ratio.—*L. R. Waldron.*

4961. SAX, KARL. Sterility relationship in Maine apple varieties. Maine Agric. Exp. Sta. Bull. 307. 61-76. 1 fig. 1922.—This bulletin is mainly a study of the sterility relationship of apple varieties and the part played by insects in fertilization.—George L. Slate.

4962. SCHAFFNER, JOHN H. Sex reversal in the Japanese hop. Bull. Torrey Bot. Club 50: 73-79. 2 pl. 1923.—Experiments were made for sex reversal in *Humulus japonicus* Sieb. and Zucc., which is a dioecious plant. The results of these and similar previous experiments lead the writer to conclude that "dioeciousness with its accompanying sexual dimorphism is not due to the absence in either the staminate or carpellate individual of a complete set of hereditary factors for the expression of all the sexual characters, both male and female; nor is the monosporangiateness of the normal individual due to the presence of a homozygous or heterozygous condition of any kind of hereditary sex determination whatsoever."—P. A. Munz.

4963. SCHEERER. [German rev. of: JABLONSKI. Zur Vererbung der Myopie. (The inheritance of myopia.) Klin. Monatsbl. Augenheilkunde 68: 110. 1922.] Arch. Rass.- u. Ges. Biol. 14: 447. 1923.

4964. SCHEIDT. [German rev. of: WERTH, E. Der fossile Mensch. [Fossil man.] 336 p. Gebrüder Borntraeger: Berlin, 1921.] Arch. Rass.- u. Ges.-Biol. 14: 361-362. 1922.

4965. SCHMIDT, JOHS. Racial investigations. VII. Annual fluctuations of racial characters in *Zoarces viviparus* L. Compt. Rend. Trav. Lab. Carlsberg 14¹⁵: 1-24. 1921 [1922].—Individuals of *Zoarces* in a warmer, less saline water produce offspring showing a significant increase in number of vertebrae, and a decrease in number of rays in pectoral fins and pigment spots, when compared with offspring reared in the original environment. The number of hard rays in the dorsal fin was examined in addition to these 3 characters, over a period of 10 years. The averages of various characters show independent fluctuations from year to year, depending upon the conditions at the "sensitive period" in the embryo stage. The population is biotypically stationary, but the phenotype is continually changing.—A comparison of the average number of pectoral rays in populations at Roskilde Fjord and at Ise Fjord, about 50 km. kilometers distant, in years 1915-1921, shows that corresponding annual fluctuations occurred; the same external factor or factors has influenced both, although it was more impressive at Roskilde Fjorde. A study of the number of hard rays in the populations at Roskilde Fjord and at Kjels Nors, Langeland, for 1913-1919, also reveals the similar effect of environment at both places; but the constant wide differences between the races indicates the presence of genetic dissimilarities. Experiments on the common trout show that temperature may be a factor. The lowest number of vertebrae was produced from a quantity of eggs developed at the intermediate of 3 temperatures.—H. W. Feldman.

4966. SCHMIDT, JOHS. Racial investigations VIII. The numerical significance of fused vertebrae. Compt. Rend. Trav. Lab. Carlsberg 14¹⁶: 1-5. 1921 [1922].—A type of fused vertebrae occurring in the 5 last vertebrae of trout was observed in which the haemal arch is double in its proximal part, being thus bifurcated; the neural arch is double. In dealing with data on the vertebrae numbers it is satisfactory to count fused vertebrae as $1\frac{1}{2}$. When this is done, the averages of samples of normal individuals are found to coincide with those of individuals with double arches.—H. W. Feldman.

4967. SCHWARZENBACH, FRITZ. Untersuchungen über die Sterilität von *Cardamine bulbifera* (L.) Crantz unter der Annahme eines hybriden Ursprungs dieser Art. [The sterility of *Cardamine bulbifera* with reference to the theory of a hybrid origin.] Flora 115: 393-514. 3 pl., 22 fig. 1922.—The peculiarities of *C. bulbifera*—reduced sexual fertility, prolific formation of bulbils, and a chromosome number double that of other species of *Cardamine*—were studied with reference to the possibilities of its origin as a mutant or as a hybrid. The study covered ecology and geographical distribution, the cytology of pollen and ovule, comparisons with other hybrids—especially spontaneous hybrids of *Cardamine* species of the *Dentaria*

group—and experimental attempts to produce *C. bulbifera* anew by crossings. The latter were not successful. The other investigations favor the theory of a hybrid origin.—A. G. Stockey.

4968. SIEMENS. [German rev. of: DAVENPORT, C. B. *The feebly inhibited*. Carnegie Inst. Washington Publ. 236. 158 p., 89 fig. 1915.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 220. 1922. [See also Bot. Absts. 1, Entry 873.]

4969. SIEMENS. [German rev. of: HEIDE, WILHELM. *Über hereditäre Ataxie*. (On hereditary ataxia.) 37 p. Diss. Breslau, 1919.] Arch. Rass.- u. Ges.-Biol. 14: 199. 1922.

4970. SIEMENS. [German rev. of: SCHLICHTING, WALTER. *Welchen Einfluss hat der Alkohol auf die Nachkommenschaft?* (What influence has alcohol on the descendants?) Diss. Berlin, 1919.] Arch. Rass.- u. Ges.-Biol. 14: 197. 1922.

4971. SIEMENS. [German rev. of: STROOP, FRANZ. *Über eine neue Chorea-Huntington-Familie*. (A new Huntington-chorea family.) Diss. Marburg, 1919.] Arch. Rass.- u. Ges.-Biol. 14: 200. 1922.

4972. SIEMENS. [German rev. of: TOPHOVEN, FRANZ. *Statistische Erhebungen über Verhältnisse bei Knaben- und Mädchengeburten*. (Statistical investigations on the ratio of male and female births.) Diss. Bonn, 1919.] Arch. Rass.- u. Ges.-Biol. 14: 196. 1922.

4973. SIEMENS, H. W. *Über die Grundbegriffe der modernen Vererbungslehre*. [On the fundamental concept of modern genetics.] Münchener Mediz. Wochenschr. 65: 1402-1405. 1918.

4974. SIEMENS, H. W. *Was ist Rassenhygiene?* [What is race hygiene?] Deutschlands Erneuerung 2: 280-282. 1918.

4975. SIEMENS, H. W. *Erbliche und nichterbliche Disposition*. [Hereditary and non-hereditary disposition.] Berliner Klin. Wochenschr. 56: 313-316. 1919.

4976. SIEMENS, H. W. *Über Vorkommen und Bedeutung der gehäuften Blutsverwandschaft der Eltern bei den Dermatosen*. [Occurrence and significance of cumulative sangunity of the parents in the dermatoses.] Arch. Dermatol. u. Syphilis Org. 132: 206-226. 1921.

4977. SIRKS, M. J. [Dutch rev. of: BLUHM, A. *Über einen Fall experimenteller Verschiebung des Geschlechtverhältnisses bei Säugetieren*. (A case of experimental shifting of the sex-ratio in mammals.) Sitzungsber. Preuss. Akad. Wiss. 34: 549-556. 1921.] Genetica 4: 536-537. 1922.

4978. SIRKS, M. J. [Dutch rev. of: HAECKER, V. *Allgemeine Vererbungslehre*. (General text-book of genetics.) 3rd ed., 16 × 24 cm., ix + 444p., 149 fig. Friedr. Vieweg Sohn: Braunschweig, 1921 (see Bot. Absts. 10, Entry 92).] Genetica 4: 465. 1922.

4979. SIRKS, M. J. [Dutch rev. of: SIEMENS, H. W. *Einführung in die allgemeine Konstitutions- und Vererbungs-pathologie*. (Introduction to general constitutional and hereditary pathology.) 229 p., 80 fig. Julius Springer: Berlin, 1921.] Genetica 4: 479. 1922. [See also Bot. Absts. 11, Entry 3859; 12, Entries 215, 1736.]

4980. STÄHLI, J. *Das Krankheitsbild des Keratokonus vom Standpunkte der Variabilitätslehre* (mit zwei klinischen Beispielen von Familiarität des Keratokonus und einen Anhang mit Bemerkungen zur Myopiefrage). [The pathological aspect of conical cornea from the

standpoint of the theory of variation (with two clinical cases of familial conical cornea and a supplement with notes on the question of myopia.) *Klin. Monatsbl. Augenh.* 62: 712. 1919. [See also *Bot. Absts.* 11, Entry 355.]

4981. STEHLIK, W. Bekämpfung des Wurzelbrandes bei der Zuckerrübe durch ihre Züchtung. [Control of sugar beet root-rot by breeding.] *Öst.-Ung. Zeitschr. Zuckerind. Landw.* 47: 1-10. 1918.

4982. STEHLÍK, V., AND V. TYMICH. Šlechtitelský význam varieta typu skládajících českou červenou přesinku. [The genetical significance of varieties and types in red Bohemian commercial wheat.] *Zemědělsky Arch.* 11: 335-365. 1921.

4983. STRAMPELLI, B. Un nuovo caso di disgiunzione pigmentale in una infiorescenza di "Dahlia variabilis." [On a new case of pigmental disjunction in an inflorescence of "Dahlia variabilis."] *Annali Bot.* 15: 276-279. 2 fig. 1922.

4984. SÜFFERT, F. [German rev. of: (1) MEIROWSKY, W. Über die Entstehung der sogennanten kongenitalen Missbildungen der Haut. (On the origin of the so-called congenital defects of the skin.) 192 p., 70 fig. W. Braumüller: Wien, 1919. (2) MEIROWSKY, W., UND LEVEN. Tierzeichnung, Menschenscheckung und Systematisation der Muttermäler. (Animal color patterns, spotted human beings, and the classification of moles and birth marks.) 79 p., 19 pl., 283 fig. Julius Springer: Berlin, 1921.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 29: 214-219. 1922.

4985. TANAKA, TYÔZABURÔ. Citrus fruits of Japan; with notes on their history and the origin of varieties through bud variation. *Jour. Heredity* 13: 243-253. *Frontispiece*, 2 fig. 1922 [1923].—Nearly $\frac{1}{10}$ of the Japanese "orange" crop consists of *Unshû Mikan* (called "Satsuma" in U. S. A.), belonging to the mandarin species. The Owari variety of Satsuma has produced 2 variant forms known as Kairyô Unshô and Wasé; it is considered certain, in view of the pollen sterility of Satsumas, that they did not arise from fertilized eggs. The Wasé, which differs in many characters from Owari, has been found in several localities; slight differences among these strains indicate an independent origin and several of them are known to have originated by bud variation. The Wasé frequently produces branches of Owari, and this ready reversion to the parental type suggests that the Wasé may be a chimera. Other cases of genetic bud variation in *Citrus* are mentioned, including a form with corrugated fruit which always has 2 types of leaf and fruit on the same tree. The author discusses the characteristics and Japanese history of other varieties of *Citrus*. The Washington navel orange is made fruitful, in spite of the cool, moist climate, by a dwarfing process.—Howard B. Frost.

4986. TEMPLETON, G. S. Unusual color inheritance. *Jour. Heredity* 14: 39-40. 1 fig. 1923.—One calf of the Angus bull, Quoman of Tierra Alta 248,048, by a Hereford cow is red instead of black, the usual color in this cross. The 38 other calves sired by this bull are all black; nevertheless the only logical way to account for the color of this 1 calf is to assume that the bull is heterozygous for red. As 35 of these calves were out of pure-bred Angus cows, the heterozygous condition of the sire would hardly be expected to show in these crosses.—R. C. Cook.

4987. THAYER, PAUL. Raspberry breeding notes. *Jour. Heredity* 14: 12-13. 1 fig. 1923.—The writer describes a cross between a yellow *Rubus occidentalis* and a yellow *Rubus strigosus* resulting in the production of a yellow *Rubus neglectus*. This suggests the possible production of red- or black-fruited "purple caps" by using a yellow fruited or albino variety as 1 parent.—Crosses of Cuthbert and Ranere showed a surprising number of plants with sterile bloom, especially when the close botanical relationship of the 2 is considered.—Paul Thayer.

4988. TRABUT, LOUIS. *Carpoxénie et mutations gemmaires chez les citrus cultivés.* [Carpoxenia and bud mutations in cultivated citrus.] *Compt. Rend. Acad. Sci. Paris* 176: 772-774. 1923.—The author discusses the so-called "bud mutations" of citrus, and suggests that part of these variations may be due to cross-pollination. For several years he has noted variant fruits on citrus trees, especially with navel oranges. Occasional navel oranges have contained seed, which are due to cross-pollination since these varieties have no pollen; variant sectors of rind have been noted on such fruits. One fruit of Golden Buckeye navel orange had a sector of rind resembling the rind of the fruit of a citron tree near by. It is suggested that cross-pollination may modify the fruit ("carpoxenia") and even buds near it ("cladoxenia").—Howard B. Frost.

4989. TURESSON, GÖTE. *The scope and import of genecology.* *Hereditas* 4: 171-176. 1923.—Advance in ecology has been mainly along 2 lines: individual organism as related to environment (autecology) and plant communities, or vegetation, as related to environment (synecology). Autecology has a twofold aspect, viz., the ecology of the individual organism as well as of the species. This paper points out the radically different nature of the problems involved.—Modifications of organisms in response to different environmental factors have already been studied, but the hereditary variation in relation to habitat has been neglected. Hereditary variations within the species are rarely mentioned in autecological works.—The Linnean species is composed of a great number of hereditary forms of different and complex types confined to definite habitats. The species and their hereditary habitat types, as related to environment, constitute a phase of ecology not previously studied. This study necessitates cultivation, under the same conditions, of a great number of individuals of the species collected in different habitats. These plantings must be supplemented by breeding experiments.—Species-ecology is denoted by the term genecology as distinguished from the ecology of the individual organism, or autecology. From the point of view of genecology the Linnean species represent a genetically complex community the distribution and composition of which are determined largely by ecological factors and the genotypical constitution of the individuals composing the species community. The name ecospecies has been employed by the author. Hereditary variation within the ecospecies and its relation to habitat conditions is one of the most important problems in genecology. The ecospecies becomes differentiated into different hereditary types when distributed over an area presenting different habitats. Ecotype is a term used to cover the ecological sub-unit of the ecospecies arising as a result of the differentiation of the species-population in response to particular habitat conditions.—The main objects of genecology are to determine the grouping in nature of individuals into ecospecies and ecotypes which represent various combinations of Mendelian factors and to determine the causes which control this grouping.—Genecological units do not necessarily coincide with the units of the systematists, due to a large extent to different conceptions of the species. From the genecologist's point of view the species represent an intercrossing community, the members of which have secondarily become clustered in groups, namely, ecotypes on account of the differentiating effect of environmental factors upon the genotypically heterogeneous population. From the systematist's point of view a species is composed of a "forma genuina" and deviations are subordinated under this type as varieties and forms of less systematic value.—Aside from the untenability of this view, the supposed type may include a number of ecotypes and several varieties may conversely be found as normal constituents of one and the same ecotype. There is a tendency too by systematists to split the species into smaller ones, creating many units, all of which rank as species.—Only as long as these small species (elementary species, vicarial species, microspecies, etc.) represent ecotypes, a point to be investigated in each case, and only as long as they are present as constituent parts of the community of individuals called ecospecies do they tell anything of the morphology of that community from a genecological point of view.—Purely genetical units do not cover the genecological. The genetical analyses of Linnean species proved the constancy of the genotype, which then became the real unit in genetics while the Linnean species, being an aggregate of individuals with different genotypical construction, is still held to be a purely conventional conception.—To transfer the species concept to the pure line

concept on account of the constancy of the genotype is to ignore the ecological side of the species problem. Because of its genetically heterogeneous nature the Linnean species is able to cover a vast region by responding genotypically to a wide range of different habitats within the region. A knowledge of the origin of the genecological units can thus be gained by studying the ecotypes.—The behavior of species hybrids in nature is of particular interest in genecology. When it has been found by experimentation that individuals belonging to different Linnean species may be crossed and give fertile offspring, the question is raised as to the causes of the rarity of such species hybrids in nature. A closer study of the distributional peculiarities of these hybrids, i.e., their localization at isolated points within the region covered by the 2 species, their sporadic occurrence between the distribution areas of the 2 parent species, and the tendency of certain species hybrids to increase when nature is disturbed by man tend to emphasize the view that the study of the species problem along the lines indicated is urgently needed as a complement to the Mendelian study of the species problem, if a deeper understanding of the questions involved is to be attained.—The importance of genecology for other branches of natural science in its relation to plant geography both as to questions of species in regard to plant communities, is especially apparent. The analysis of plant communities during the past few years, particularly in Sweden, had disclosed that associations are made up of groups of plants of different associative values. Some of these species are constantly found wherever the particular association occurs and hence are called constants. Because the species belonging to the constant group accompany the association over a wide geographical range it is concluded that these species do not respond to ecological factors prevailing in the different regional points but remain constant, forming the fixed frame-work of the association. This conclusion, however, is not warranted from a genecological point of view. A genecological study of the constants of the particular association from different geographical points of its distribution area is needed before such a statement can be made. Many of these constants are notoriously variable, which points rather to the fact that it is the ability of these species to respond genotypically to a wide range of different ecological factors that enables them to establish associations in dissimilar climatic regions.—*H. L. Shantz.*

4990. WEATHERWAX, P. **The story of the maize plant.** (Univ. of Chicago Sci. Ser.) 247 p., 2 col. pl., 174 fig. University of Chicago Press: Chicago; Cambridge University Press: Cambridge, 1923.—This is a general treatise on the history, origin, morphology, culture, and heredity of maize. The several theories of the origin of maize are discussed and the conclusion is reached that maize developed by simple evolution from an ancestral form common to *Zea*, *Tripsacum*, and *Euchlaena*.—Xenia, multiple factors, hybrid vigor, methods of breeding, and the technique of hybridization are discussed in 2 chapters devoted to heredity and breeding, but much material of interest to geneticists is found throughout the book. The flowering habits, the process of fertilization, and the development of the endosperm are discussed in detail as well as the morphology of the vegetative parts of the plant. The chapters devoted to these subjects are compiled largely from the author's previously published papers.—*J. H. Kempton.*

4991. WINGE, Ö. **On a partial sex-linked inheritance of eye color in man.** *Compt. Rend. Trav. Lab. Carlsberg* 14¹²: 1-23. 1921 [1922].—Statistics from diverse sources for the most part agree in showing a perceptibly greater frequency of brown eyes among women than among men. There would seem to be only 2 possible explanations: either there is a differential death rate with reference to sex and eye-color or there is some form of sex-linked heredity. A critical examination of data based on 1399 Danish children and their parents furnishes the basis for a discussion of this question. No satisfactory evidence is found for a selective death rate, but there seems to be evidence for a sex-linked factor. This evidence is illustrated by families in which one parent has blue eyes, the other brown. In such matings, if the father has brown eyes there is an excess of brown-eyed daughters; if he has blue eyes there is an excess of blue-eyed children of both sexes. Two dominant factors for brown eye pigment are postulated; *B*, the one generally recognized, and *W*, a sex-linked factor. It is further

assumed that *b W* eggs do not survive. When the theoretical relative frequency of different types of matings is computed on this hypothesis the agreement between the observed and expected distribution of eye color in children from matings of all types is remarkably close. The hypothesis would also account for some of the rare but undoubted cases in which blue-eyed parents produce brown-eyed children. Others of these cases are due to a restrictive factor, which results in blue eyes in a genotypically brown-eyed individual. This latter factor also tends to affect the visual acuity.—*C. H. Danforth.*

4992. WRIGHT, SEWALL. **The effects of inbreeding and crossbreeding on guinea-pigs.** U. S. Dept. Agric. Bull. 1090. 63 p., 6 pl., 11 fig. 1923.—Inbreeding of guinea pigs by brother-sister matings has been continued for 13 years, 1906–1919. Each of 23 families, with 2 exceptions, originated from 1 pair of animals. Of these, 18 existed in 1915; in 1917, 5 were selected for perpetuation. As many as 23 generations had been recorded in 1921. In 1911 records were started on a control stock which was maintained by avoiding matings as close as those between second cousins.—I. A slow average decline in vigor in all characteristics has occurred. In fertility (frequency and size of litter) the effect was most marked; it can not be accounted for by environmental conditions. “The decline is greater in the gains after birth than in birth weight, and greater in the percentage raised of the young born alive than in the percentage born alive. The ability to raise large litters has fallen off much more than ability to raise small litters. A comparison of the inbred guinea-pigs with a control stock, raised under identical conditions without inbreeding, and derived in the main from the same line bred stock as the inbred families, indicates that the inbreds have suffered a genetic decline in vigor in all characteristics. The decline in fertility is again shown to be most marked. Experimental inoculation with tuberculosis has shown that the inbreds were inferior on the average to the controls in disease resistance.” The sex ratio was unaffected.—II. An obvious differentiation in various characters occurred among the inbred families, which increased as inbreeding progressed. Each family became strikingly uniform in color; members could be readily recognized by their color and pattern. “In a similar way, certain subfamilies became differentiated from other subfamilies and from other families by developing a strong tendency toward reappearance of an ancestral 4th toe on the hind feet.” * * The tendency to produce a given type of monstrosity has been characteristic of certain families. Such a tendency has had no connection with the vigor of the family in other respects. * * There was evidence of heredity within the families of the tendency to produce these abnormalities. There was no evidence that inbreeding has any specific causal connection with the origin of the monsters. Inbreeding seems merely to have brought to light genetic traits in the original stock.”—Traits of vigor, including size and frequency of litters, percentage born alive, percentage raised of those born alive, birth weight, and gain to 33 days showed greater differences between families than could be due to chance. A positive correlation, in some cases high, existed between averages of these characters in early and late periods of the history of each family. The records of individual families show no correlation in the average of the different groups of characters, with the exception of birth weight or gain and size of litter. Some families showed extreme vigor in some respects and extreme weakness in others; some showed a combination of extreme vigor in all respects; others a combination of weakness. “The conclusion seems warranted that there was heredity of all traits studied. There did not appear to be heredity of general vigor.” Hereditary factors which affect each character by itself are easily distinguished from environmental factors which affect alike growth, mortality among the young, and fertility in all their aspects.—*H. W. Feldman.*

4993. ZIEGLER, H. E. [German rev. of: HERTWIG, OSKAR. **Zur Abwehr des ethischen, des sozialen, des politischen Darwinismus.** (A defense of Darwinism, ethically, socially, and politically.) 2nd ed., 121 p. Jena, 1921.] Arch. Rass.- u. Ges.-Biol. 14: 212–218. 1922.

HORTICULTURE

J. H. GOURLEY, *Editor*

(See also in this issue Entries 4757, 4770, 4858, 4904, 4932, 4934, 4950, 4954, 4955, 4961, 4962, 4985, 4987, 4988, 5126, 5163, 5175, 5240)

FRUITS AND GENERAL HORTICULTURE

4994. ANONYMOUS. *Berichte der Höheren Gärtnerlehranstalt zu Dahlem, der Höheren Staatlichen Lehranstalt für Wein, Obst, und Gartenbau zu Geisenheim a.Rh. und der Höheren Staatlichen Lehranstalt für Obst- und Gartenbau zu Proskau für die Rechnungsjahre 1920 und 1921.* [Reports of the higher horticultural institute in Dahlem, the higher government institute for wine, fruit, and truck crops in Geisenheim on Rhine, and the higher government institute for fruit and truck crops in Proskau for the period of 1920-1921.] Landw. Jahrb. 57: *Ergänzungsband I*, 1-139, 1-107, 1-117. 1922.—Reports are given of progress of the various experiments carried on in the above named institutions and detailed description of the activities.—*S. A. Waksman.*

4995. ANONYMOUS. [Rev. of: METHUEN, A. *An alpine A B C and list of easy rock plants.* $x + 35$ p. Methuen and Co.: London, 1922.] *Nature* 111: 216. 1923.

4996. ARENS, P. *Zijn aan het tappen met driptins voordeelen verbodden?* [Are drip-tins advantageous in tapping?] *Arch. Rubberecult.* 3: 36-41. 1919.—The notion that tins from which water drips upon the cut surface after tapping are helpful in securing increased yields of rubber is not well founded. The author tapped 3 fields without tins and used tins on 3 adjacent fields. The following month tins were used on the first 3 fields and removed from the others. No differences were observed either in total yield or in percentage of grades of rubber.—*C. D. La Rue.*

4997. BALLOU, F. H., and I. P. LEWIS. *Spraying experiments in southeastern Ohio, 1922.*—*Monthly Bull. Ohio Agric. Exp. Sta.* 8: 42-50. 1923.—A report is given of spraying experiments for the control of apple scab and blotch in southern Ohio on trees over 30 years of age. Fruit was classified as follows: (1) free from scab; (2) only slightly scabbed; (3) blemished but not deformed by scab; and (4) deformed by scab. Varying strengths of lime sulphur and bordeaux mixture were used. A special feature of the plots sprayed with bordeaux was the variation and the quantities of lime and copper sulphate employed.—*R. C. Thomas.*

4998. BEACH, FRANK. *Picking, packing, and loading apples in bushel baskets and barrels.* *Monthly Bull. Ohio Agric. Exp. Sta.* 7: 197-200. 1923.—The author emphasizes that perfectly grown apples should be so picked and packed as to retain their original value. Methods for packing in bushel baskets and barrels are covered; 19-inch basket pads and star covers are preferred for covering bushel baskets. Proper loading of bushels into cars is discussed.—*R. C. Thomas.*

4999. BRISON, F. R. *Variations in pecans.* *Jour. Heredity* 13: 366-368. 1 fig. 1923.—The pecan is monoecious and wind-pollinated. A high percentage of cross-pollination takes place. Each pecan is apt to vary in genetic constitution from all other pecans on the tree owing partially to the difference in paternal influence as well as to the heterozygous character of the pecan. Seed from the Mother San Saba pecan tree was planted. Pecans produced by the resulting seedlings varied in size from those as large as beans to those over 2 inches in length, indicating that the pecan will not reproduce true from seed. Variations in shape, thickness of shell, and cracking quality were also marked. The development of the pecan is so recent that there remains great opportunity for finding seedlings good enough to introduce as named varieties.—*F. R. Brison.*

5000. BURKETT, J. H. **The pecan in Texas.** Texas Dept. Agric. Bull. 73. 146 p., 9 pl., 25 fig. 1922.—Pecan growing is becoming an important industry in Texas.—The author discusses varieties, methods of grafting, planting, soils, diseases, and insect pests.—*L. Pace.*

5001. DE CASTELLA, F. **Home wine-making.** Jour. Dept. Agric. Victoria 19: 89-102, 176-180. 1 fig. 1921.

5002. DETLEFSEN, J. A., and W. A. RUTH. **An orchard of chestnut hybrids.** Jour. Heredity 13: 305-314. 7 fig. 1923.—A brief résumé of the introduction of the European and Japanese chestnuts is followed by the description of a cross between the American Sweet and the Japanese. Observations on 175 F_2 segregating trees showed loss of remarkable vigor of F_1 and greatly increased variability in many characters, such as size of nut, amount of tomentum, number of nuts to a burr, character of the burr, time of ripening, size of trees, resistance to weevils, etc.—*J. A. Detlefsen.*

5003. GOURLEY, J. H. **Peach growing in Ohio.** Monthly Bull. Ohio Agric. Exp. Sta. 8: 35-42. 1923.—This is a general summary of best practices. The management of young and old orchards is reviewed, including necessary spray programs. Mention is made of the distribution of the peach industry in the state, the soils best adapted to growing, and the varieties best suited to Ohio conditions.—*R. C. Thomas.*

5004. KEIL, J. B. **Apple pollination.** Monthly Bull. Ohio Agric. Exp. Sta. 8: 51-58. 1923.—A report is given of pollination experiments between 1914 and 1917 with the more common commercial varieties of apples; 2479 pollinations were made, which gave a 25 per cent setting. The investigations offer some explanation for the behavior of orchards when planted with large blocks of a similar variety and bring out the desirability of mixed plantings.—*R. C. Thomas.*

5005. RIJES, A. B. **Bastonderzoek en uitdunning.** [Bark examination and thinning.] Arch. Rubbercult. 4: 345-360. 1920.—Results obtained on the Djasinga Estate in Java are discussed. The author considers bark examination a better criterion for thinning than measurement of the latex yield.—*C. D. La Rue.*

5006. SCHOLL, ERNEST E. **Orcharding in Texas, and nursery inspection.** Texas Dept. Agric. Bull. 72. 247 p., 108 fig. 1922.—Texas nuts and fruits for 1919 were valued at \$14,952,135.—The discussion includes: hazards, preparation of soil, selection and planting, tillage and cover crops, pruning, spraying, grafting, kinds of fruit, orchard pests.—*L. Pace.*

5007. SWINGLE, WALTER T., and T. RALPH ROBINSON. **Two important new types of citrus hybrids for the home garden.**—Citrangequats and limequats. Jour. Agric. Res. 23: 229-238. Pl. 1-5. 1923.—Thomasville citrangequat is a trigeneric hybrid produced by using pollen of Willits citrange (*Citrus sinensis* \times *Poncirus trifoliata*) to fertilize flowers of the oval kumquat, *Fortunella margarita*. The trees are large and vigorous, endure winter temperatures as low as 12°F., are not readily forced by warm weather in late winter, and possess the resistance to citrus canker [caused by *Pseudomonas Citri*] of the female parent. The fruit resembles that of the lime. The oil of the peel is not bitter and the pleasantly acid juice can be used for ade from July to October, after which the fruits are sweet enough to eat out of hand.—Other citrangequats are mentioned and technical descriptions are presented of the following new varieties: Thomasville, Telfair, Sinton.—Eustis limequat is a hybrid resulting from fertilizing the flowers of common or West Indian lime with pollen from the round kumquat. The tree is much hardier than the lime and probably can be grown in the warmer parts of the U. S. A. Gulf Coast. It is more or less everbearing. The fruits resemble closely the lime in color, flavor, size, and texture, and the rind is edible. Technical descriptions are presented of the following varieties: Eustace, Lakeland, and Tavares.—*D. Reddick.*

5008. VISCHER, W. *De anatomische bouw van het latexvaten-stelsel bij Hevea in verband met de latex-productie.* [The anatomical structure of the latex-vessel system of Hevea in relation to the latex yield.] Arch. Rubbercult. 4: 473-492. 1920.—The latex capacity of the roots is found to be far less than that of the trunk; the roots cannot, therefore, be considered a latex reservoir. Two types of distribution of latex vessels are found. In 1, the number of vessels is approximately the same for a considerable distance from the base of the tree; in the other the number decreases rapidly from the base upwards. Trees of the latter type are less valuable. Most of the vessels of the roots and the trunk are in direct connection and latex-movements of considerable extent may take place. Radial connections between different rings of vessels are uncommon. Tapping a cut has a direct influence on the pressure in the vessels 1 m. from the cut. Tapping a tree affected with brown bast disease is injurious even though the tapping cut is on a surface which is still healthy. Tapping with 2 cuts, 1 above the other, is condemned because the yield from the upper cut is low in proportion to the bark used and the exhaustion of the vessels in the bark between the cuts may increase susceptibility to brown bast disease.—C. D. La Rue.

5009. VRIES, O. DE. *Verdere gegevens over den invloed van het tappen op latex en rubber.* [Further data on the influence of tapping on latex and rubber.] Arch. Rubbercult. 4: 314-330. 1920.—Prolonging the tapping cut has the same effect as heavier tapping in general: the rubber-content of the latex decreases; the specific gravity increases; and the rubber vulcanizes more rapidly. Increasing the number of tapping cuts has the same effect as lengthening the cut. Two cuts, 1 low and 1 high but on a different surface, gave rubber that was practically identical for both cuts. Two tappings on the same cut in 1 day were tried, but no difference was found in the rubber. Tapping to the wood gave the same results as lengthening the tapping cut but to a more marked degree. Tapping a piece of bark isolated by a cut to the wood all round it did not give a latex with low rubber content and high specific gravity, as was expected. Tapping at different hours of the day gave no differences in the properties of the rubber. The use of drip tins does not affect the properties of the rubber.—C. D. La Rue.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

5010. ANONYMOUS. *Note.* Nature 111: 267. 1923.—It is announced that bulbs of *Chionodoxa*, *Galanthus*, *Scilla*, *Fritillaria imperialis*, *F. Meleagris*, *Muscari*, *Ixia*, and *Eranthis* have been added to the list of bulbs permitted unlimited entry into the U. S. A. for 3 years beginning January 1, 1923.—O. A. Stevens.

5011. BALLOU, F. H. *Ornamental planting in development of the small homestead.* Monthly Bull. Ohio Agric. Exp. Sta. 8: 8-13. Fig. 3-6. 1923.—The development of a ramshackle barn lot into an attractive landscape is illustrated and discussed. Emphasis is placed on the plant materials used, and the short time required to reach an effective landscape scene.—R. C. Thomas.

5012. BARRON, LEONARD. *Lawn-making. Together with proper keeping of putting greens.* vi + 176 p., 31 pl. Doubleday, Page & Co.: New York, 1923.—The 14 chapters treat of renovating the old lawn; how to make a lawn once for all; economical grading; which is better, turf or seed; the fine art of mowing, rolling, and watering; how to feed a lawn; solving the seed problem, insects, etc; the truth about "lawn mixtures;" seed mixture for special purposes; lawns for subtropical regions; the best lawn tools and their use; how to make lawn pictures; the peculiar requirements of putting greens; guide to the best lawn grass. This is a practical treatise on the making and maintenance of a lawn.—J. H. Gourley.

5013. BENEDICT, R. C. *Which Boston fern is best?* Jour. Heredity 13: 254-263. 7 fig. 1922.—An experiment is outlined to determine which of the numerous varieties of the Boston fern are most desirable for florists and for the home. Only the once-pinnate varieties are included in this test of 6 months duration. Sets of these varieties are available for distribution to growers who wish to cooperate.—R. C. Cook.

5014. HOTTES, ALFRED C. **A little book of annuals.** 116 p., 51 fig. A. T. De La Mare Co.: New York, 1922.—“This little book of annuals has been written for the increasing throng of amateurs who grow flowers for the love of them. It is meant to be a guide through the season of annual bloom.” The chapters (unnumbered) treat of the use and culture of annuals grown for their flowers; of ornamental grasses; everlastings; decorative seed pods; and annual vines.—*J. H. Gourley.*

5015. HOTTES, ALFRED C. **A little book of perennials.** 170 p., illus. A. T. De La Mare Co.: New York, 1923.—This work treats of the commonly grown perennials, flowers and ornamental plants. The propagation, culture, uses, and treatment for disease and insect pests of perennials are treated.—*J. H. Gourley.*

5016. HOTTES, ALFRED C. **Practical plant propagation.** 224 p., 108 fig. A. T. De La Mare Co.: New York, 1922.—“This book attempts to explain briefly the art and science of increasing plants so that the florist, orchardist, nurseryman, and amateur plant lover may have a guide in the work of properly increasing his stock.” The chapters treat of seeds; cuttings, bulbs, layers and divisions; graftage and stocks; important florists’ plants; herbaceous perennials, annuals, bulbous plants; and tree and shrub list.—*J. H. Gourley.*

5017. MAKINS, F. K. **Olive cultivation in the Ionian Islands.** Indian Forest. 48: 521-530. 1922.

5018. PALMER, F. E. **Milady’s house plants.** 176 p., illus. A. T. De La Mare Co.: New York, 1922.—The author indicates the purpose of the volume as being “to set down briefly and clearly all the more important facts for the benefit of those who are seeking knowledge on this particular subject.” The following subject heads indicate the character of material treated: companionship of flowers; fundamental requirements of all plants; foliage plants for house decorations; flowering plants for house decoration; bulbous plants; house plants out-of-doors in summer; sowing of seeds and rooting of cuttings; outside window boxes in winter; insect pests and remedies; how to treat cut flowers; and sun parlors as plant rooms.—*J. H. Gourley.*

5019. ROGERS, W. S. **Planning your garden.** $x + 301$ p., 105 fig. Doubleday, Page & Co.: Garden City, New York, 1923.—“This volume is designed for those who are not inclined to make use of the service of a professional garden designer. Either excessive cost or intense personal interest in the development of the home grounds may effect this result.” It is a practical treatment of the subject of garden making and the art of landscaping home grounds or estates. The 21 chapters give a comprehensive treatment of the various phases of such a problem including the planting and working out of the grounds, the details of making flower borders and beds, lawns, rock garden, rose garden, vegetable garden, use of water in the landscape, fences and hedges, and other details.—*J. H. Gourley.*

5020. SAFFORD, W. E. **Discovery of the ancestral form of *Dahlia Juarezii*.** Jour. Heredity 13: 377-381. 3 fig. 1923.—All cactus Dahlias come from a single plant sent to Europe from Mexico about 1863. This was a “double flowered” form quite similar to the modern variety “Khalif,” and was taken as the type-specimen of a new species, *D. Juarezii*. In 1916 the simple, 8-rayed progenitor of this species was found in Guatemala by Wilson Popenoe.—It is not generally known, but to the Aztecs belongs credit for originating the double-flowered Dahlias, by crossing the wild forms native to the mountains of Mexico.—*R. C. Cook.*

5021. STOUT, A. B. **Sterility in lilies.** Jour. Heredity 13: 369-373. 3 fig. 1923.—It is pointed out that in lilies at least Darwin’s “Law of Compensation” does not apply, the failure to set seed so often noted being due to incompatibility of the pollen used. In some varieties, chiefly hybrids between different species, complete impotence of pollen is found, but this is unusual. It has been found possible to produce seed of almost all species of lilies studied, by proper selection of pollen, although this has been difficult in some cases.—*R. C. Cook.*

5022. THOMAS, CHARLOTTE RIDER. *Garden whimsys*. vii + 171 p. Macmillan Co.: New York, 1923.—This is a little volume for the amateur flower lover, unpretentious but full of enthusiasm throughout. No attempt is made to give cultural directions and yet, almost parenthetically, many good suggestions are made. The book is well written, evidently designed to win converts to the small yard garden, and deserves a place in the library of every gardener. The 12 chapters deal with bulbs, irises, peonies, roses, perennials, annuals, shrubs, and garden pets.—*J. H. Gourley*.

VEGETABLE CULTURE

5023. FREEMAN, ELLA M. *The home vegetable garden*. vi + 214 p., 8 pl. Macmillan Co.: New York, 1922.—This is the 2nd in a series of books known as the Open Country Books, edited by L. H. Bailey. The purpose of this volume is to interest amateurs in the vegetable garden in part from the nature-study standpoint as well as for the large returns obtainable from a small acreage. The cultural directions are brief and the lists of varieties seem scarcely adequate even for a work of this character. The 30 chapters deal with the pleasure of gardening; laying out, planting, and care of the garden; insect and disease pests; and the culture of the various crops.—*J. H. Gourley*.

5024. KAKAZAKI, Y. *Self-sterility in Chinese cabbage*. Jour. Heredity 13: 374-376. 1 fig. 1923.—Chinese pe-tsai cabbage is ordinarily almost entirely self-sterile. The author desired a quantity of self-fertilized seed, and it was thought possible that there might be greater compatibility between flowers of the different branches of the same plant. The following experiments were tried: (1) flowers were bagged without pollinating artificially; (2) flowers were pollinated artificially with pollen from (a) the same flowers, (b) different flowers in the same inflorescence, (c) different inflorescences on the same plant, (d) different plants. The degree of self-sterility was the same from whatever part of the plant the pollen came, but considerable variation was found in the degree of self-sterility in different plants. It is suggested that a self-fertile strain might be secured by selection.—*R. C. Cook*.

5025. KEIL, J. B. *Dependable varieties of vegetables*. Monthly Bull. Ohio Agric. Exp. Sta. 8: 23-25. 1923.—The article offers a list of vegetables which may serve as a guide to beginners and gardeners of more experience. This list does not include all of the good varieties but aims to call attention to really meritorious ones.—*R. C. Thomas*.

5026. PEMBER, F. R. *A study of the influence of physical soil factors and of various fertilizer chemicals on the growth of the carnation plant*. Rhode Island Agric. Exp. Sta. Bull. 187. 94 p. 1921.—As a 6-year average 40 per cent of the number of flowers produced in 9 months, October-June, were gathered during the first 6 months.—The keeping quality of the flowers was not materially affected by the soil treatment.—Retaining the same soil, plus manure, for 5 years reduced the yield of the best grade of flowers by an average of about 5 per cent below that from fresh soil and manure.—Splitting of the calyces was not affected by sodium silicate nor by extreme progressive increase or decrease in the application of the fertilizer; but where nitrogen was added in large amounts to either soil and manure, or to sand, the percentage of split calyces was reduced.—Chlorosis was unaffected by limestone and by ferrous sulphate.—When the dry material contains about 2 per cent of nitrogen, 0.5 per cent phosphoric oxide, and 1.5-2 per cent potassium oxide the nutritional needs for these ingredients probably have been supplied.—*B. L. Hartwell*.

5027. ROCKWELL, F. F. *Gardening under glass*. x + 297 p., illus. Doubleday, Page & Co.: Garden City, New York, 1923.—The volume is divided into 2 parts, the 1st dealing with gardening under glass, and the 2nd with cultivation of special crops.—This is a well prepared book of a distinctly popular nature. The 1st part treats of cultural matters and the 2nd of growing violets, pineapples, palms, grapes, fruit trees in pots, vegetables in frames, greenhouse and bedding plants, vegetables under glass, and roses.—*J. H. Gourley*.

5028. WOOLEY, R. V. GIFFORD. **Tomato cultivation under glass and outdoors.** 32 p., 2 fig. Country Life: London; Charles Scribner's Sons: New York, 1922.—Chapters on winter cropping, seed sowing, and pests and diseases are included.—C. S. Gager.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 4806, 4829, 4832, 4837, 4841, 4843, 4963, 4967, 4990, 5008, 5134, 5144, 5278, 5283)

5029. BEAUVERD, G. **Tératologie du *Primula vulgaris* Huds.** [Teratology of *Primula vulgaris*.] Bull. Soc. Bot. Genève 13: 8. 1921.—Two specimens were found with abnormal calyx and green corolla.—W. H. Emig.

5030. BOBILIOFF, W. **Onderzoekingen over het ontstaan van latexvaten en latex bij *Hevea brasiliensis*.** [The origin of latex vessels and latex in *Hevea brasiliensis*.] Arch. Rubbercult. 3: 43-65. 1919.—Latex formation was studied in plants of all ages from the young seedling to the mature tree. In young cotyledons the latex vessels were observed to develop by the absorption of the cross walls of a row of cells, and also by the growth and branching of some of the cells. Latex formation takes place as soon as the vessels develop. The latex-vessels can be traced directly back to the meristematic tissue. Latex may form in one part of a plant independently of the remainder of the plant. Caoutchouc formation takes place within the latex vessel itself.—C. D. La Rue.

5031. BOWMAN, H. H. M. **Histological variations in *Rhizophora mangle*.** Rept. Michigan Acad. Sci. 22: 129-134. Pl. 9-12. 1920 [1921].—Tannin is very abundant in all parts of the mangrove plant, especially in the hypodermal leaf cells. These leaf tannin cells are larger in plants growing in more concentrated salt water and there is often an extra layer of hypodermal water-storage cells. The cells of the "transfusion tissue" (so-called by Warming) are thin walled, turgid, and filled with mucilage and are without the thickenings on the walls reported by Warming. In nearly all parts of the plant are stone cells or idioblasts. These are mostly H-shaped or even stellate, with the lumen nearly filled by the thickened, lignified wall. The anthers are of the plurilocular type. The pericycle is a dense ring of sclerenchymatic tissue, making the wood exceedingly tough.—Ernst A. Bessey.

5032. BOWMAN, H. H. M. **The development and activation of hibernacula.** Papers Michigan Acad. Sci. 1: 61-73. Pl. 26-29. 1923.—A study of the factors governing the production of hibernacula in *Spirodela polyrrhiza* (L.) Schleid., *Lemna trisulca* L., *Ceratophyllum demersum* L., *Cabomba caroliniana* A. Gray, and *Myriophyllum spicatum* L. At different times various species of *Utricularia* were also used. The hibernacula of *Lemna* and *Spirodela* are small fronds, heavily charged with starch, which sink to the bottom. Those of the other species are short shoots with smaller crowded leaves, and short internodes, the tissues also being filled with starch. These hibernacula developed in November in aquaria where the temperature remained constant, apparently as a response to the reduced illumination. The activation of the hibernacula is also described.—Ernest A. Bessey.

5033. BROWN, ELIZABETH DOROTHY WUIST. **Apogamy in *Phegopteris polypodioides*.** Bull. Torrey Bot. Club 50: 17-34. Fig. 1-20. 1923.—Cultures of spores from 2 sources were grown from unmodified and modified Prantl's and Knop's solutions. The filamentous stage was variable in length and could be induced by reversion by unfavorable cultural conditions. Male prothallia were most numerous in modified solutions, female in the unmodified. Both monoecious and dioecious prothallia occurred in all cultures. A large number of apogamous growths are described and the conditions under which such occurred are discussed. It is pointed out that physiological study of fern gametophytes is of importance in shedding light on the expression of various sexual phenomena.—P. A. Munz.

5034. COOK, O. F. Diversity of internode individuals. Jour. Heredity 13: 323-328. 4 fig. 1923.—The successive internodes of the same vegetative shoot represent biological equivalents. Therefore, by a comparison of such internodes or even by comparing the halves of the same leaf or other symmetrical organ the problem can be studied of whether biological processes are carried on with mechanical exactness, or whether normal diversity is to be expected. The fact that homologous parts of the same plant are often as different as species, genera, or families does not support the theory that paths of development are followed exactly. In spite of cytological studies very little is known of the nature of the inherited characters, the results that are produced being the only basis of judgment of the nature of the reproductive processes.—R. C. Cook.

5035. ETTER, AUSTIN. Polyembryony developed under experimental conditions in certain polypodiaceous ferns. Bull. Torrey Bot. Club 50: 95-107. Pl. 4, fig. 1-6. 1923.—Polyembryony in *Matteuccia Struthiopteris*, *Onoclea sensibilis*, *Dryopteris mollis*, and *Pteris longifolia* was shown to occur occasionally in ordinary cultures and under experimental conditions. Division of prothallia often resulted in regeneration by each part and in subsequent sporophyte formation. The conclusion is made that, when the gametophyte is of sufficient vigor, 1 to several sporophytes may be nourished and brought to independent existence.—P. A. Munz.

5036. LEPESCHKIN, W. Recherches sur les organes du bord des jeunes feuilles. (Contribution au problème des organes inutiles des plantes.) [Researches on the marginal organs of young leaves; a contribution to the problem of useless organs of plants.] Bull. Soc. Bot. Genève 13: 226-235. 1921.—It is not possible to state the causes for the change of form in marginal organs of leaves. The cause for the changes is supposed to lie in the residue of a mass of hereditary units.—W. H. Emig.

5037. PILGER, R. Ueber Verzweigung und Blütenstandbildung bei den Holzgewächsen. [On branching and the formation of the inflorescence in woody plants.] Bibliotheca Bot. 90. 1-37. 36 fig. 1922.—The growth of woody plants, even in the tropics, is periodic. The portion of the twig which grows between one rest period and another the author (following Volkens) terms a "schub." In the north, or in dry regions, the schub extends from winter bud to winter bud. In the tropics, it is often difficult to determine the limits of the schub, as it is marked only by rest periods. The schub is more commonly unbranched at the north, more commonly branched in the tropics. The branching is termed 'prolepsis.' The branches of the schub may behave differently, some maturing at once, others developing later. The branched tropical schub is primitive. The panicle is the primitive type of inflorescence and represents a portion of a branched schub in which the leaves have been reduced. Its origin is seen in *Chamaecyparis*. The single flowered inflorescence is reduced from the primitive paniculate type. The Ranales do not usually show a primitive type of inflorescence. Inflorescences borne on old and on new shoots represent a specialization of schubs. Those on new shoots are terminal on the vegetative schub. Those on old wood are entirely separate naked schubs. The separation of flower shoots and vegetative shoots is discussed at length. The following special plants are described fully to illustrate the points made: *Corylus*, *Alnus*, *Betula*, *Acer*, *Cornus*, *Forsythia*, and *Nerium*.—K. M. Wiegand.

5038. SAHNI, B. Modern Psilotaceae and archaic terrestrial plants. Nature 111: 84. 1923.—One or more cauline xylem strands devoid of protoxylem are normally present in the pith of *Tmesipteris Vieillardii* Dang., an erect terrestrial form said to be endemic in New Caledonia. This may be regarded as a stage in the disintegration of a once continuous and solid cylinder of cauline xylem. Medullary xylem was recorded in *Tmesipteris* by Bertrand in 1885 and by Dangeard in 1890-91.—O. A. Stevens.

5039. WOODCOCK, E. F., and R. DEZEEUW. The anatomy of the haustorial roots of *Comandra*. Rept. Michigan Acad. Sci. 22: 189-192. Pl. 15. 1920 [1921].—A brief description, with

drawing, depicts the anatomy of the haustorial roots of *Comandra pallida* attacking the roots of apple. Material was collected in the state of Washington. The penetration of the haustorium is effected by pressure and the solvent action of a secreted enzyme. A clasping portion of the haustorial root can be distinguished from the absorbing part.—*Ernst A. Bessey*.

5040. DEZEEUW, RICHARD. The value of double infiltration in botanical microtechnique. *Papers Mich. Acad. Sci.* 1: 83-84. 1923.—A method is described for infiltrating material with celloidin and subsequently with paraffin, which makes possible the cutting of thinner sections than by the use of celloidin alone, while retaining the advantages of the celloidin method.—*Ernst A. Bessey*.

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

L. H. TIFFANY, *Assistant Editor*

(See in this issue Entries 4774, 4865, 4989, 5050)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 4774, 4849, 4989)

5041. ANDREWS, F. M. Abnormal elaters of *Porella platyphylla*. *Bull. Torrey Bot. Club* 50: 85-87. *Pl.* 3. 1923.—Elaters of variously branched and other abnormal types are described and figured from material collected in Indiana.—*P. A. Munz*.

5042. CAMPBELL, DOUGLAS HOUGHTON. An interesting liverwort. *Science* 57: 384-385. 1923.—Specimens of the Asiatic *Monoselenium tenerum* Griffith have recently been found in a nursery at Oakland, California. This species, based on Indian specimens in 1849, was not again reported until 1910, when Goebel published a new account of it, his material having appeared on earth brought from Canton. The Californian plants were undoubtedly introduced with nursery stock from China or Japan, where the species may not be rare. *Monoselenium* is related to *Dumortiera*.—*C. J. Lyon*.

5043. DISMIER, G. Trois muscinées nouvelles pour la région parisienne: *Platygyrium repens* Br. eur., *Lioclaena lanceolata* Nees et *Jamesoniella autumnalis* (De Cand.) Steph. [Three bryophytes new to the Parisian region: *Platygyrium repens*, *Lioclaena lanceolata* and *Jamesoniella autumnalis*.] *Bull. Soc. Bot. France* 66: 313-316. 1919.—The author, on the basis of his own collections, reports *Platygyrium repens* from near Ferté-Milon (Aisne), *Lioclaena lanceolata* from near Boissy-Saint-Léger (Seine-et-Oise), and *Jamesoniella autumnalis* from the same locality. The 1st and 3rd represent additions to the flora of the district around Paris, while the 2nd is a great rarity. Under each species the distribution in France is discussed, and the *Platygyrium* is accompanied by descriptive notes.—*A. W. Evans*.

5044. DOUIN, CH. Les erreurs en hépatologie. [Mistakes in hepaticology.] *Compt. Rend. Assoc. Franç. Avanc. Sci.* 43 [Rouen]: 610-613. 1922.—Three common mistakes made by students of the Marchantiales are discussed. The 1st is the assumption of a group of apical cells in the thalli of certain genera; in the author's opinion there is never more than 1 apical cell. The 2nd is the supposed distinction between a "true" dichotomy of the thallus, derived from a group of apical cells, and a "false" dichotomy, derived from a single apical cell. The 3rd is the supposed distinction between "composite" and "simple" sexual receptacles.—*A. W. Evans*.

5045. LEE, WILLIAM A. Irish *Sphagna*. *Irish Nat.* 31: 18-23. 1922.—The author reviews the work done on the peat mosses of Ireland and catalogues the species according to the Warnstorffian system, the distribution being indicated by "vice counties." The list includes 31 species, 62 varieties, and 56 forms and subforms.—*A. W. Evans*.

5046. LEE, WILLIAM A. *Irish Sphagna*. *Irish Nat.* 33 [i.e., 32]: 28-29. 1923.—This is a supplement to an earlier list bearing the same title (see preceding entry). The author lists 10 species, 21 varieties, and 21 forms and subforms of *Sphagnum*, mostly from the counties of Dublin and Wicklow. The records represent "vice-comital" additions and include 3 varieties and 11 forms and subforms not found in the earlier list.—A. W. Evans.

5047. ZODDA, G. *Brevi notizie sulle briofite dell' isola di Rodi*. [Notes on the bryophytes of the island of Rhodes.] *Bull. Soc. Bot. Ital.* 1921: 38, 39. 1921.—A collection of bryophytes made by the author in 1919 in the vicinity of the city of Rhodes and on Mt. Smith yielded 18 species, 13 of which were new to the island. The known bryophytic flora of Rhodes now includes 49 mosses and 7 hepatics.—A. W. Evans.

5048. ZODDA, G. *Cenni sulle briofite forlivese*. [Notes on the bryophytes of Forlì and vicinity.] *Bull. Soc. Bot. Ital.* 1921: 49-52. 1921.—A report is given on a collection of bryophytes made by P. Zangheri in the vicinity of Forlì, Italy. The list of species includes 55 mosses and 11 hepatics and of these, 16 mosses and all the hepatics are new to the district.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

DONALD S. WELCH, *Assistant Editor*

(See also in this issue Entries 4774, 4794, 4816, 4847, 5116, 5117, 5119, 5123, 5124, 5125, 5127, 5128, 5218, 5229, 5231, 5233, 5234, 5235, 5239, 5243, 5253, 5254)

FUNGI

5049. BULLER, A. H. REGINALD. *Rea's British Basidiomyceteae*. [Rev. of: REA, CARLETON. *British Basidiomycetae: A handbook to the larger British Fungi*. xii + 799 p. (Published under the auspices of the British Mycological Society.) Cambridge University Press: London, 1922 (see Bot. Absts. 12, Entry 1978).] *Nature* 111: 213-214. 1923.—"The volume is indispensable to all students of fungi on both sides of the Atlantic. In accuracy of description the book is an immense advance on anything previously produced in Britain." The dropping of main divisions based upon spore characters has its advantages, but in some groups spore color seems to be of more importance than the other characters, e.g., in *Coprinus*.—O. A. Stevens.

5050. BUSTOS, M. R. ESPINOSA. *Informe del Jefe de la seccion Plantas Cryptogames*. [Report of the section of cryptogamic plants.] *Bol. Mus. Nacion. Santiago* 11: 269-270. 1918/19 [1920].—The author reports collections of *Marasmius*, *Lepiota*, *Psilocybe*, *Peziza*, *Fomes*, *Heterosporium*, *Ustilago*, *Gyromitra*, *Clavaria*, and *Sclerotinia*.—*Heterosporium gracile* was found parasitic on the leaves of *Iris florentina*, *Sclerotium Trifoliorum* parasitic on *Trifolium repens*, and *Ustilago Triticici* (Pers.) Jens. causing the loose smut of wheat.—The algae *Nitella clavata* (Berter) A. Braun, *Chara coronata* Ziz., and *C. fragilis* Desv. were collected, the latter 2 for the 1st time in Chile.—J. A. Faris.

5051. COUPIN, HENRI. *Fungi*. *Album Gén. des Cryptogames Fasc.* 29-35. *Pl.* 182-236. [1922?].—The author completes the treatment of the Sphaeriales, presents the Laboulbeniaceae, and begins the consideration of the fleshy Basidiomycetes. [See also Bot. Absts. 10, Entry 585].—J. R. Schramm.

5052. KAUFFMAN, C. H. A black rot of squash. Rept. Michigan Acad. Sci. 22: 201-202. 1920.—Hubbard squashes (*Cucurbita maxima* Duchesne) in storage developed a dry rot in which the invaded tissues turned black and showed an abundance of dark brown mycelium. When grown in pure culture on synthetic sugar agar the mycelium remained sterile and lacked pigment; on corn-meal agar the mycelium became dark and pycnidia developed after 15 days. A healthy squash inoculated with a bit of mycelium from a pure culture developed the characteristic rot in a few days. The fungus is *Diplodina citrullina* Grossb., the pycnidial stage of *Mycosphaerella citrullina* Grossb.—Ernst A. Bessey.

5053. KAUFFMAN, C. H. *Collybia strictipes*, developed in the laboratory. Rept. Michigan Acad. Sci. 22: 203-204. 1920.—The fruiting bodies of the fungus appeared on a mass of wet, partially decayed leaf-mass filled with a whitish web of mycelium, when brought into the laboratory in October and kept wet for 2 months.—Ernst A. Bessey.

5054. KAUFFMAN, C. H. *Mortierella bainieri*. Rept. Michigan Acad. Sci. 22: 195-199. Pl. 16. 1920.—The mold under consideration was collected on forest leaves near Ann Arbor, Michigan. The cultural characters of the species are described in detail.—Ernst A. Bessey.

5055. KAUFFMAN, C. H. The mycological flora of the higher Rockies of Colorado. Papers Michigan Acad. Sci. 1: 101-150. Pl. 30-34. 1923.—This paper is an annotated list of the fungi collected by the author and companions near the continental divide in the mountains of Colorado in 1917 and 1920, mostly at elevations of 9000-10,000 feet. The fungi listed were mostly found in the forests. The following new forms are described: *Dasyscypha pulverulentum* (Lib.) Sacc. var. *fruticicola* n. var., *Helotium alnicola* n. sp., *H. sulphuratum* (Schum.) Phil. var. *Piceae* n. var., *Hymenoscypha scutula* (Pers.) Phillips var. *Grossulariae* n. var., *Odontotrema minus* Nyl. f. *salicella* n. f., *Strickeria megastega* (E. & E.) n. comb. (*Teichospora megastega* E. & E.), *Boletus tomentosus* n. sp., *Collybia albiflava* (Pk.) Kauff. var. *montana* n. var., *Cortinarius bistreoides* n. sp., *C. citrinellus* n. sp., *C. glaucopodoides* n. sp., *C. griseoluridus* n. sp., *C. metarius* n. sp., *C. nigrocuspidatus* n. sp., *C. pinetorum* (Fr.) n. comb. (*C. argentatus* var. *pinetorum* Fr.), *Marasmius piceina* n. sp., *M. pinastris* n. sp., *Pholiota platyphylla* n. sp., *Stropharia squamosa* var. *subalpina* n. var., *Tricholoma tristiforme* n. sp.—Ernst A. Bessey.

5056. LENDNER, A. Le *Clathrus cancellatus* Tourn. nouveau pour la flore mycologique Genevoise. [*Clathrus cancellatus* Tourn. new for the mycological flora of Geneva.] Bull. Soc. Bot. Genève. 13: 29-30. 1921.

5057. MARTIN, CHARLES ED. Une mise au point sur la nomenclature du *Boletus aereus* Bulliard. [Certain facts concerning the nomenclature of *Boletus aereus* Bulliard.] Bull. Soc. Bot. Genève 13: 5-7. 1921.—*Boletus aereus* of the French mycologists is an entirely different species from *B. aereus* of the Central European mycologists. *B. aereus* of Krombholz, considered the type species by all mycologists except the French, is the *B. irideus* of Rostkovius, which is only a subspecies of *B. edulis*, not a distinct species.—W. H. Emig.

5058. PONCY, R. Un champignon nouveau pour la Suisse. [A fungus (*Omphalia candida* Bresadola) new to Switzerland.] Bull. Soc. Bot. Genève 13: 20. 1921.

5059. YASUDA, A. Notes on fungi (130). Bot. Mag. Tokyo 37: (34)-(35). 1923. [In Japanese.]—*Polyporus Patouillardii* Rick, *Boletus griseus* Frost, and *Calocera cornea* (Batsch) Fries are discussed.—J. R. Schramm.

5060. YASUDA, A. Notes on fungi (131). Bot. Mag. Tokyo 37: (66)-(68). 1923. [In Japanese.]—*Peniophora glebulosa* (Fr.) Bres., *Dothidea puccinioides* (DC.) Fr., and *Trametes protracta* Fries are considered.—J. R. Schramm.

LICHENS

5061. LESDAIN, BOULY DE. Lichens du Mexique (Etats de Puebla et Michoacan) recueillis par le Frère G. Arsène Brouard. Premier supplément. [Mexican lichens collected in Puebla and Michoacan by Bro. Arsène Brouard. First supplement.] Brochure, 16 × 22 cm., 23 + 4 unnumbered p., mimeographed. Preface dated Covington, Louisiana, September, 1922.—The 1st 4 pages of this brochure are by Brother BROUARD and detail the circumstances of publication of the early list [see Bot. Absts. 7, Entry 372] of which this is a supplement, the occasion of the issue of the present list, and briefly outline the physiographic characters of the localities where collections were made. The body of the brochure, by Lesdain, lists 116 species, varieties, or forms of lichens and 4 of parasitic Basidiomycetes, with 1 page containing corrections in the earlier article mentioned above. There is full citation of localities and collector's numbers and a considerable body of references to earlier literature. The following novelties are proposed, authority in all cases being Bouly de Lesdain: *Aspercilla mircoacensis*, *Acarospora Brouardi*, *Allarthonia mexicana*; *Heppia michoacanensis* var. *adnata*, *Endocarpon pallidum* var. *montanum*, *E. pusillum* var. *Arsenii*; *Evernia furfuracea* f. *ceratea* and f. *scobicina*, *Placodium mexicanum* f. *imbricata*, *P. murorum* f. *tectorum*, *Psora nigrorufa* f. *terrena*. *Placodium murorum* var. *radiatum* B. de L. (= *Lecanora* Hué) appears to be a new combination. There is additional descriptive matter or discussion relative to *Heppia Brouardi* B. de L., *H. leptopholis* Nyl., *Placodium murorum* var. *congestum* Flag., *F. sazorum* Flag., *F. bolacinum* Tuck., *F. interfulgens* Tuck., *Buellia tumida* Bagl., *Endocarpon pusillum* var. *minor* B. de L., *Staurothele clopina* Th. Fr., *Collema glaucophthalmum* Nyl., *C. texanum* Tuck., *Leptogium Hildenbrandii* Nyl., and *Tromera Resinoe* Krb.—E. B. Chamberlain.

5062. MAMELI, EVA. Contributo alla lichenologia del Forlivese. [Contribution to the lichenology of Forli.] Atti Ist. Bot. Univ. Pavia III, 1: [1-22.] 1923.—About 200 species and varieties are listed, of which 128 are new to Emilia. No new species or names occur.—J. R. Schramm.

5063. OLIVIER, H. Lichens du Chile determines. [Catalog of the lichens of Chile.] Bol. Mus. Nacion. Santiago 11: 271-277. 1918/19 [1920].

BACTERIA

5064. ADAMS, F. O., and H. A. HARDING. Test of commercial thionins for staining Frost little plates. [Abstract.] Absts. Bact. 7: 23. 1923.—Thionin is found useful not only for staining colonies in plates but also for staining individual cells for microscopic examination.—D. Reddick.

5065. ALLEN, P. W. Description of a method for determining the gelatin liquefying power of bacteria by a fluidity method: A substitution for solid gelatin plates. [Abstract.] Absts. Bact. 7: 4-5. 1923.—The method is described in sufficient detail in the abstract to be duplicated.—D. Reddick.

5066. BENGTON, IDA A. A toxin-producing anaerobe isolated from fly larvae. [Abstract.] Absts. Bact. 7: 17. 1923.—The organism is called *Bacillus botulinus* type C. It resembles the 2 other types in its effect on animals, but the toxin which it produces is not neutralized by the antitoxins of the American strains known as types A and B.—D. Reddick.

5067. BENGTON, IDA A. Classification of anaerobes producing toxins poisonous by mouth. [Abstract.] Absts. Bact. 7: 17. 1923.—Three types of *Bacillus botulinus* are discussed.—D. Reddick.

5068. BERGEY, D. H. Report of the committee on determinative bacteriology. [Abstract.] Absts. Bact. 7: 2. 1923.

5069. BURKE, GEORGINA S. **The differential staining of live and dead spores of *Clostridium botulinum*.** [Abstract.] Absts. Bact. 7: 5. 1923.—Method: stain in steaming carbol-fuchsin, destain with absolute acetone, and counter stain with methylene blue. Living spores are stained only in the outer zone, whereas dead ones are stained throughout.—D. Reddick.

5070. BURKE, VICTOR, and MARY DUNNING. **A modified method for staining acid fast organisms and bacterial spores.** [Abstract.] Absts. Bact. 7: 5. 1923.—Technique: place slide in a beaker of steaming carbol-fuchsin for 2-5 minutes; wash in water without drying; decolorise in acetone until faintly pink; counter stain as usual.—For spores the process is as follows: stain in steaming carbol-fuchsin for 1 minute; wash in water without any drying; decolorize with 2-3 changes of acetone, leaving acetone on slide for 2 seconds at each change; counter stain as usual.—D. Reddick.

5071. CONN, H. J. **Methods of pure culture study. Report of committee on bacteriological technic.** [Abstract.] Absts. Bact. 7: 1. 1923.

5072. CONN, H. J. **Standardization of bacteriological apparatus. Report of committee on bacteriological technic.** [Abstract.] Absts. Bact. 7: 1. 1923.

5073. CONN, H. J. **Standardization of stains. Report of committee on bacteriological technic.** [Abstract.] Absts. Bact. 7: 1-2. 1923.

5074. DARLING, C. A. **Counting micro-organisms in tomato products.** [Abstract.] Absts. Bact. 7: 10. 1923.

5075. FROST, WILLIAM D., and FRED A. M. BACHMANN. **Hemolytic *Streptococci* in high grade milks.** [Abstract.] Absts. Bact. 7: 20. 1923.—In 18 per cent of the samples examined the alpha type was found and in 10 per cent the beta type occurred.—D. Reddick.

5076. ENLows, ELLA M. A. **A sugar-free medium for fermentation studies.** [Abstract.] Absts. Bact. 7: 8-9. 1923.—Procedure and formula are presented.—D. Reddick.

5077. EVANS, ALICE C. **A comparison of strains of the alpha type of *Streptococcus* from pathologic and from dairy sources.** [Abstract.] Absts. Bact. 7: 12. 1923.—“No characteristic was found which could distinguish the 2 groups.”—D. Reddick.

5078. GRAHAM, ROBERT, and I. B. BOUGHTON. **A spontaneous disease of chickens and ducks associated with a toxic anaerobe.** [Abstract.] Absts. Bact. 7: 29-30. 1923.—The organism, which is described in some detail seems to be *Clostridium botulinum* type C of Bengtson [see Bot. Absts. 12, Entry 5066].—D. Reddick.

5079. HAMMER, B. W., and MERLE P. BAKER. **Studies on the *Strep. paracitrovorus* group.** [Abstract.] Absts. Bact. 7: 12-13. 1923.—*Streptococcus paracitrovorus* represents a group of organisms, widely distributed in dairy products, the most striking characteristic of which is the fermentation of citric acid. Certain variations exist but data are not yet available justifying a division into types.—D. Reddick.

5080. HULL, THOMAS G., and HUGH CASSIDAY. **Preserved cultures in the Widal test.** [Abstract.] Absts. Bact. 7: 3-4. 1923.

5081. JONES, DAN H., and J. GIBBARD. **Microbiological investigation of sweet clover silage.** [Abstract.] Absts. Bact. 7: 20-21. 1923.—“Bacterial, yeast and mold determinations were made before, during, and after the period of fermentation of 6 lots of sweet clover [*Melilotus alba*?] silage ensiled at different dates from June 1st to July 20th, 1922.”—D. Reddick.

5082. KELSER, R. A. The identification of *Bacillus botulinus* and its toxin in culture and in canned foodstuffs by serological methods. Amer. Jour. Public Health 13: 366-376. 1923.—“Culture of *B. botulinus*, either in a pure or contaminated state, can be identified by means of complement-fixation titrations,” the details of which are given.—C. A. Ludwig.

5083. KOSER, STEWART A. *Bacillus Welchii* in bread. [Abstract.] Absts. Bact. 7: 10-11. 1923.—A strain of the organism of a low grade of virulence was found to be the active gas producer in a commercial “salt rising” bread “starter.” The organism was isolated from baked loaves.—D. Reddick.

5084. KOSER, STEWART A. Utilization of organic acid salts by the colon-aerogenes group. [Abstract.] Absts. Bact. 7: 8. 1923.—“It is believed that the salts of the commoner organic acids are entitled to a wider use by bacteriologists than that accorded them at present. Such compounds should form a valuable series of test substances in the differentiation and classification of bacterial groups.”—D. Reddick.

5085. KULP, WALTER L. Casein digest media for growing *Lactobacillus acidophilus* and *Lactobacillus bulgaricus*. [Abstract.] Absts. Bact. 7: 9. 1923.

5086. KULP, WALTER L., and LEO F. RETTGER. A comparative study of the fermentative action of *Lactobacillus bulgaricus* and *Lactobacillus acidophilus*. [Abstract.] Absts. Bact. 7: 16-17. 1923.—“The only sharp difference between the fermentative action of these 2 groups of aciduric organisms is their action on a medium containing pure levulose, and the degree of acidity produced in milk and other carbohydrate media.”—D. Reddick.

5087. LEVINE, MAX, and D. C. CARPENTER. On gelatin liquefaction of bacteria. [Abstract.] Absts. Bact. 7: 4. 1923.

5088. MELLON, RALPH R. Observations on the relation of bacterial giant coccoids to zygospore formation. [Abstract.] Absts. Bact. 7: 18. 1923.—A pleomorphic form, *Bacillus* sp., was studied. “Employing an environment that led the strains to reproduce in their fungoid or branching phase, a mechanism was demonstrated that was practically identical morphologically with zygospore formation as it occurs among the yeasts.”—D. Reddick.

5089. MOON, M. P. Certain non-spore forming rods found in raw milk. [Abstract.] Absts. Bact. 7: 25. 1923.

5090. MOUNCE, MARION J. A capsulated slime-forming strain of *Bacterium cloacae*. [Abstract.] Absts. Bact. 7: 18. 1923.

5091. PALMERLEE, C. A. Albert's toluidin blue as a routine stain for diphtheria bacilli. Amer. Jour. Public Health 13: 363-365. 1923.—This stain differentiates diphtheria bacilli from all other bacteria. It seems also to differentiate virulent and non-virulent forms, although the data at hand are insufficient to permit a positive statement.—C. A. Ludwig.

5092. ROBERTSON, A. H. A preliminary report of the bacterial flora of milking machines. [Abstract.] Absts. Bact. 7: 19-20. 1923.

5093. RODRIGUEZ, F. E. Studies on the specific bacteriology of dental caries. [Abstract.] Absts. Bact. 7: 28. 1923.—*Bacillus odontolyticus* is proposed as the name for a group of high acid producing bacteria which cause lesions in teeth.—D. Reddick.

5094. STURGES, WILLIAM S. A modification of the blood-agar plate. [Abstract.] Absts. Bact. 7: 4. 1923.

5095. STURGES, WILLIAM S. Studies on halophylic micro-organisms. The flora of meat curing solutions. [Abstract.] Absts. Bact. 7: 11. 1923.

5096. WARTHIN, A. S., E. BUFFINGTON, and R. C. WANSTROM. A study of rabbit spirochetosis. Jour. Infect. Diseases 32: 315-332. Pl. 1-12, fig. 1-24. 1923.—Investigations on the spontaneous spirochetosis of rabbits led the authors to the conclusion that *Treponema cuniculi*, which is responsible for the disease, is distinct from *Treponema pallidum*. These 2 organisms of similar appearance differed morphologically and could be distinguished by staining. The Wassermann reaction was negative for rabbits infected with the organism.—R. L. Starkey.

5097. WELDIN, JOHN C., and MAX LEVINE. An artificial key to the species and varieties of the colon-typoid or intestinal group of bacilli. [Abstract.] Absts. Bact. 7: 13-16. 1923.

5098. WHITING, W. A. The relation between utensil contamination and the clumping of bacteria in market milk. [Abstract.] Absts. Bact. 7: 19. 1923.

5099. YATES, J. W. Pin point colonies in plates from pasteurized milk. [Abstract.] Absts. Bact. 7: 24. 1923.

5100. ZOLLER, HARPER F. The value of milk powder agar in the bacteriological laboratory. Amer. Jour. Public Health 13: 384-387. 1923.—This agar is easily prepared, gives higher counts for all milk products than the standard agar, and serves as a means of detecting both acid forming and proteolytic-enzyme forming organisms.—C. A. Ludwig.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

(See also in this issue Entries 4851, 5038)

5101. ANONYMOUS. The distribution of life in the southern hemisphere and its bearing on Wegener's hypothesis. Nature 111: 131. 1923.—This is an extract from a recent discussion before the Royal Society of South Africa. "Prof. Compton regards the botanical evidence as completely opposed to Wegener's theory. Dr. DuToit regards the paleobotanical evidence as too fragmentary."—O. A. Stevens.

5102. BERRY, EDWARD W. Miocene plants from southern Mexico. Proc. U. S. Nation. Mus. 62⁹: 1-27. Pl. 1-7. 1923.—This article describes 33 species of Miocene plants from the Isthmus of Tehuantepec in southern Mexico. These comprise 2 ferns, 1 monocotyledon, and 30 dicotyledons, all of which are new except species of *Ficus*, *Nectandra*, *Goepertia*, and *Guet-tarda*. The facies is that of tropical lowlands and is distinctly South American in affinities. Following are the new species: *Gymnogramme Wadiei*, *Acrostichum mexicanum*, *Coussapoa veracruziana*, *Anona saraviana*, *Moquillea mexicana*, *Connarus carmenensis*, *Anacardites lanceolatus*, *Liquidambar incerta*, *Inga miocenica*, *Dioclea (?) mexicana*, *Leguminosites mexicanus*, *L. oaxacensis*, *Fagara Wadiei*, *Drypetes elliptica*, *Cedrela miocenica*, *Simaruba veracruziana*, *Gouania miocenica*, *Nectandra tehuantepecensis*, *Mespilodaphne palomarensis*, *Myrcia saraviana*, *Lecythidophyllum couratarioides*, *Melastomites angustus*, *M. obovatus*, *Apocynophyllum mexicanum*, *Allamanda carmenensis*, *Crescentia cucurbitinoides*, *Bignonoides orbicularis*, and *Rondeletia (?) sp.*—E. W. Berry.

5103. CUNO, J. B. The mystery of a buried forest. Amer. Forest. 29: 105-106. 1 fig. 1923.—This article concerns the discovery of a prehistoric cypress swamp in Washington, D. C., which geologists claim is the remains of a forest dating back 30,000-100,000 years. The writer believes that the trees were felled by the early settlers of the region and removed for use in building construction elsewhere, since no trunks of trees were found during the excavation.—Chas. H. Otis.

5104. GOTHAN, W. Ein Fund natürlicher Zellulose im Miocän des Niederlausitzer Braunkohlenreviers. [The discovery of unaltered cellulose in the Miocene of the Niederlausitz brown coal district.] Zeitschr. Deutsch. Geol. Ges. 74: 159-161. 1922.—The author reports the presence of unaltered cellulose, as determined chemically, in unidentified wood from the Miocene brown coal of Niederlausitz.—E. W. Berry.

5105. GOTHAN, W., und K. NAGALHARD. Kupferschieferpflanzen aus dem niederrheinischen Zechstein. [Copper shale plants from the lower Rhein Zechstein.] Jahrb. Preuss. Geol. Landes. 42¹: 440-460. Pl. 5-7. 1922.—The following species are recorded from the Zechstein of the lower Rhein region and the indicated environmental conditions are discussed. All the plants are new to this horizon in the Permian: *Ulmannia Bronni* Goeppert, *U. frumentaria* (Schlot.) Goeppert, *U. Solmsi* new name, *Voltzia* sp., *Callipteris Martinsi* (Germar) Zeiller, *Sphenopteris Kukukiana*, and *S. Gibbelsi* n. sp.—E. W. Berry.

5106. HOWE, M. A. Two new Lithothamnieceae, calcareous Algae, from the lower Miocene of Trinidad, British West Indies. Proc. U. S. Nation. Mus. 62²⁴⁵³: 1-3. Pl. 1-4. 1922.—*Lithothamnium pennyi* and *Lithophyllum trinitense* are discussed as new.—E. W. Berry.

5107. KRYSHTOFVICH, A. N. Report on the results of studies in Japan 1919-1920. Rec. Geol. Comm. Russian Far East 13. 1-12. 1921.—This is an account in Russian of the author's paleobotanical studies in Japan in the years mentioned.—E. W. Berry.

5108. KRYSHTOFVICH, A. N. Some Tertiary plants of Possiet Bay, southern Ussuri District, collected by Mr. E. Ahnert. Rev. Geol. Comm. Russian Far East 11. 1-32. Pl. 1-3. 1921.—This is an account in Russian of the Eocene flora from this district in eastern Siberia. None of the species is new, but some are recorded from this region for the 1st time.—E. W. Berry.

5109. KRYSHTOFVICH, A. N. Tertiary plants from Amagu River, Primorskaya Province, discovered by Mr. A. Kuznetsoff. Rec. Geol. Comm. Russian Far East 15. 1-15. Pl. 1-3. 1921.—This account in Russian records and illustrates 16 species of plants from the Eocene of eastern Siberia.—E. W. Berry.

5110. LAKE, PHILIP. Wegener's hypothesis of continental drift. Nature 111: 226-228. 1923.—The hypothesis is based on the idea that the continental masses are patches of lighter rock moving upon a denser one which forms the floor of the ocean. One of the chief arguments is that the frequencies of heights above sea level and depths below sea level show well marked maxima at 100 and 4700 m. respectively. Wegener concludes that 2 distinct surfaces standing at these altitudes must have been involved in the subsequent movements, and that according to mathematical laws a deformation of a single level would not produce such maxima. G. V. Douglas in a paper to appear in the Geological Magazine shows that the actual frequency curve is consistent with ordinary geological conceptions and does not require the original existence of 2 surfaces.—Wegener imagines that at the close of the Carboniferous period the upper layer formed one continuous patch covering about $\frac{1}{2}$ the globe. The *Glossopteris* flora of India is found also in Australia, the Falkland Islands, the Antarctic continent, and in South America. In Wegener's reconstruction these are brought together. But this flora also is found in Kashmir, northwestern Afghanistan, northeastern Persia, Tonquin, northern Russia and Siberia. These areas are widely separated from the other by Wegener. The writer discusses geological features further, concluding that the 2 sides of the Atlantic could not have been united as was suggested by Wegener.—O. A. Stevens.

5111. NOÉ, A. C. Coal balls. Science 57: 385. 1923.—The writer seeks information concerning deposits of coal balls which, though not previously reported in North American coal seams, are here reported from Illinois, Kentucky and Texas.—C. J. Lyon.

5112. SEWARD, A. C. A study in contrasts: The present and past distribution of certain ferns. Jour. Linn. Soc. Bot. 46: 219-240. Pl. 16-19. 1922.—The author discusses the present and past distribution of the fern families Gleicheniaceae, Matonieae, Dipteridinae, Schizaeaceae, and Marattiaceae as understood by him and illustrated by maps.—E. W. Berry.

5113. TORREY, RAY ETHAN. The comparative anatomy and phylogeny of the Coniferales, Part 3.—Mesozoic and Tertiary coniferous woods. Mem. Boston Soc. Nat. Hist. 6: 41-106. Pl. 8-15. 1923.—Diagnoses are given of the following lignitic woods: *Dadoxylon* sp., *Voltzi-oxylon documense* n. gen. & sp., *Pitoxylon* sp., *P. scituatensiforme* n. comb., *P. cf. Vateri* Platen, *Pseudotsuga annulata* n. comb., *Podocarpoxyylon texense* n. sp., *P. washingtonense* n. sp., *P. McGeei*, *P. dakotense* n. sp., *Sequoioxylon montanense* n. gen. & sp., *S. dakotense* n. sp., *S. laramense* n. sp., *S. Burgessii* n. comb., *Brachyoxylon Woodworthianum* n. sp., *B. raritanense* n. sp., *B. comanchense* n. sp., *Paracupressinoxylon cupressoides* n. comb., *P. trinitense* n. sp., *Metacupressinoxylon cedroides* n. gen. & comb., *Telephragmoxyylon brachyphyloides* n. sp., *T. comanchense* n. sp., *Araucarioxylon texense* n. sp.—This is the most extended study of lignitic woods since the description of the Cretaceous conifers of Kreischerville, Staten Island, by Hollick and Jeffrey in 1909. The "nitro-cellulose" method is used, and the photomicrographs (64 in number) show that the lignites are at last amenable to study.—Most of the stems described were collected by the writer himself, and notes are given on the geographic and geologic occurrence of the lignites of the U. S. A.—A histologic key to the lignitic woods of the U. S. A. is given, modified from earlier keys of Goeppert as developed by Stopes and Gothan. Attention is called to the fact that the species of Araucariaceae are becoming numerous, and render some form of classification necessary. Hollick and Jeffrey's *Araucariopityoideae*, *Brachyphyloideae*, and *Araucarioideae* are raised to the rank of tribes; i.e., a great Araucarian facies, especially well attested in the Cretaceous and earlier, spread far to the North, though later to be restricted to the Southern Hemisphere in sharply limited numbers. And side by side with this facies flourished the cosmopolitan pines and their relatives in even greater variety, likewise undergoing restriction in form, in habit, and in number. While on the borders of these 2 dominant forest-making elements were many and striking intermediate types. Of such the most interesting must be the *Brachyoxylon Woodworthianum* from the Cretaceous of Martha's Vineyard, since the earliest formed tracheids are close, to even *Dadoxylon* pitted; while later pitting is more Abietineous, but without bars of Sanio. Despite the Abietineous features the species is so much like an Araucarian that it must be referred to that group.—A new genus held still nearer to *Araucaria* is *Telephragmoxyylon*, thus defined: annual rings slight, traumatic resin canals, uniseriate to partly biseriate, wood rays 2-16 cells deep, few to 10 slits or "oculipores" per tracheid field; pitting in young wood uniseriate, in older wood often biseriate, and then alternate contiguous or sometimes in 2 slightly separated rows; wood parenchyma none.—The conclusion reached from these border types is that the Araucarians sprang from the Abietae in early Mesozoic time and have since been undergoing simplification. The stem of this Abietean line is the Triassic *Woodworthia* of Jeffrey with araucaroid wood and short shoots. Reversing the more usual view of the gymnosperm phylum, this also becomes a finding in open court against the tendency of the past few years to belief in a more profound parallelism, with the exact lineal ancestry seldom observed. Consonant with an Abietineo-Araucarian line, and more primitive than any of the present gymnosperms, except the cycads, *Ginkgo* is considered a "living Cordaite," only less emphatically called by Darwin a "living fossil." From the pines (Abietae) later arose the further simplified Cupresseae, and also the Taxodiaceae or Sequoioideae.—Two definitions of handy use in the anatomy of the conifers remain to record. Gothan used the expression "Kreuzungsfeld," Lignier, "aire mitoyenne," and Stopes, "tracheid-field," for the portion of a tracheid subtended by a ray cell. The pits seen in the fields, or along the tracheid surface, have been gradually modified until the old slit or "oculipore" (conventional form of an eye) becomes a round borderless opening, often large, the "oöpore."—G. R. Wieland.

5114. WHITE, D., and T. STADNICHENKO. Some mother plants of petroleum in the Devonian black shales. Economic Geol. 18: 233-252. Pl. 5-9. 1923.—The authors describe the alga

Foerstia ohioensis n. sp. and the spore sacs *Protosalvinia ravenna* n. sp. which are very abundant in the black shales and which contain both waxy and resinous compounds, as determined experimentally; and consider them, in conjunction with the waxy-resinous exines of *Sporangites*, as the probable source of petroleum.—*E. W. Berry*.

5115. WINCHESTER, DEAN E. Oil shale of the Rocky Mountain region. U. S. Geol. Surv. Bull. 729. 204 p. 1923.—This comprehensive work contains a list of plants of the Green River formation (middle Eocene) prepared by F. H. KNOWLTON; and notes on the microorganisms of the oil shales by the late C. A. DAVIS, with figures of various algae, pollen, fern annulus, etc.—*E. W. Berry*.

PATHOLOGY

FREDERICK V. RAND, *Editor*

LILIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 4741, 4795, 4796, 4907, 4927, 4981, 4997, 5000, 5003, 5006, 5007, 5008, 5010, 5015, 5023, 5026, 5028, 5029, 5039, 5050, 5052, 5180, 5226, 5233, 5251, 5270, 5272)

DISEASES CAUSED BY FUNGI

5116. ANONYMOUS. Pins sylvestres attaqués par *Armillaria mellea*. [*Pinus sylvestris* attacked by *Armillaria mellea*.] Bull. Soc. Centrale Forest. Belgique 28: 628-630. 1921.—A Belgian forest owner sent in specimens of 8-year-old *Pinus sylvestris* killed by a fungus. The latter was identified as *Armillaria mellea* and the identifying characteristics are given.—*H. T. Gisborne*.

5117. ANONYMOUS. [REV. OF SCHWARZ, MARIE B. Das Zweigsterben der Ulmen, Trauerweiden, und Pflsichbäume. (Dying of elms, weeping willows and peach trees.) Thesis, University of Utrecht, 73 p., 7 pl., 15 fig. 1922]. Rev. Applied Mycol. 2: 92-94. 1923.—In the case of die-back of elms, cultures from fragments of discolored wood taken from the interior of larger limbs constantly yielded a Graphium-like fungus which gave positive results from artificial inoculation. The author describes this fungus as *Graphium Ulmi* n. sp.—Detailed description is given of the "bark scorch" disease of *Salix alba* var. *vitellina pendula* S. upon which the fungus *Fusicladium saliciperdu* was predominant. Other fungi were also present and a Phoma which gave positive results from inoculation tests is named *Phoma intricans* n. sp. Dying of the shoots in autumn after defoliation was found due to the wound parasite *Discella carbonacea* as shown by infection trials.—Several fungi are concerned in the die-back of peach shoots common in Holland, but only *Monilia cinerea* is a true parasite. However, the author believes *Botrytis cinerea* to be responsible for the dying back of peach shoots, especially in greenhouses. Three strains of *Cytospora Prunorum* Sacc. & Syd. were also isolated and 2 of them gave infection after artificial inoculation. The 3rd, however, sometimes infected weeping willow and is considered a different physiological strain from the other 2.—*Frederick V. Rand*.

5118. ALLYN, O. M. Reducing corn root-rot by careful hand selection of seed. Jour. Amer. Soc. Agron. 15: 73-76. 1923.—Hand selection, even the 1st year, materially reduces the corn-root disease.—*F. M. Schertz*.

5119. BEACH, W. S. A crown rot of rhubarb caused by *Phytophthora cactorum*. Pennsylvania Agric. Exp. Sta. Bull. 174. 28 p., 25 fig. 1922.—Part I contains facts of general interest concerning this disease, characterized by a brown necrosis of roots, crown, and base of petioles. Outer leaves usually wilt first and this may extend to all leaves and result in their death. Sometimes the disease affects only 1 or 2 buds on the crown, the rest of the plant remaining healthy unless wet weather intervenes. The rapid progress of the disease and the discoloration of the buds serve to distinguish this disease from minor crown troubles. The severest losses occur in new plantings from crowns taken from infested fields. The loss in old fields is not

great from year to year unless long periods of warm, wet, and cloudy weather occur during July and August. New fields should be started only from crowns taken from healthy fields or from seedlings grown under disease-free conditions. Spraying with 8-8-100 Bordeaux mixture was started after the close of the pulling season in 1921 and clearly indicated that it restricted the spread of the disease during the remainder of the summer. The spray does not kill the parasite already established in the crowns. Roguing as early in the season as the diseased hills can be detected appears to be an important control measure. It is also recommended that in setting new fields with roots from old fields the roots be disinfected with HgCl_2 1:1000, or formaldehyde 1:240 for 30 minutes.—Part II is concerned with the more technical phases of the problem. The crown rot caused by *Phytophthora cactorum* is similar to "foot rot," caused by *P. parasitica* var. *Rhei* as described by Godfrey, and an undescribed *Phytophthora* "root rot" of rhubarb in southern Illinois. The crown rot here described appears to be more northern in distribution and the fungus causing it has an optimum temperature requirement of 25°C. *in vitro*. *P. parasitica* var. *Rhei* has an optimum temperature requirement of about 30°C. and the Illinois *Phytophthora* sp. reacts to temperature ranges in about the same manner. Both parasites appear to be more southern in their distribution. Pathogenic proof of *P. cactorum* from rhubarb, *P. parasitica* var. *Rhei* from rhubarb, *P. sp.* from rhubarb in Illinois, and *P. cactorum* from apple was established upon rhubarb by inoculating seedlings at various seasons with bits of test tube culture material. *P. cactorum* from rhubarb infects uninjured leaves and petioles under favorable conditions but infection of the crown and roots appears dependent upon wounds. Such wounds are afforded by the pulling of the stalks. *P. parasitica* var. *Rhei* appears able to infect more readily in the absence of wounds, as does the *Phytophthora* from Illinois. *P. cactorum* from apple infects rhubarb through wounds but with less readiness than any of the other organisms, indicating that this strain is not so readily adapted to parasitism on this host. All tissues of rhubarb exhibiting symptoms of crown rot are invaded by the mycelium. In the early stages of infection the mycelium is intercellular with lateral haustoria piercing the adjacent cells. In later stages the mycelium not infrequently develops within the cells. Generally the hyphal strands lie parallel with the longitudinal axes of the cells. However, in the region of the medullary rays the hyphae develop radially and by following these "rays" the fungus appears to be able to penetrate more deeply into the tissues of the root than is the case in petioles, where the development is more rapid in a longitudinal direction and the medullary rays are absent. Oospores of *P. cactorum* from rhubarb develop abundantly *in vitro* but have been observed only once each in petioles and crowns. Zoosporangia are developed abundantly during moist weather upon the surface of petiole spots, emerging in fascicles from the stomata. Tabulated effects of temperature and media upon the 3 species of *Phytophthora* from rhubarb together with measurements of oospores and conidia are included. The conidia of *P. cactorum* from rhubarb may germinate either by zoospores or by producing germ tubes directly. A bibliography is appended.—C. R. Orton.

5120. ELLIOTT, JOHN A. Cotton-wilt, a seed-borne disease. Jour. Agric. Res. 23: 387-393. Pl. 1-2. 1923.—Experimental data by plate culture methods and subsequent inoculation tests to prove pathogenecity show that *Fusarium vasinfectum* of cotton is at times carried within the seed coat.—Spores of the organism on the surface of seed may retain vitality for at least 5 months.—D. Reddick.

5121. ERIKSSON, JAKOB. Beizversuche mit Uspulun und Supersolfo gegen den Steinbrand des Weizens. [The treatment of bunt smut of wheat with uspulun and supersolfo.] Zeitschr. Pflanzenkrankh. 32: 289-293. 1 fig. 1922.—Uspulun is a dirty grey powder manufactured and sold by Friedr. Bayer and Co., Leverkusen, near Cologne. The principal constituent is "Chlorphenolquecksilber," to which a coloring agent is added to prevent mistaking treated grain for untreated.—Supersolfo is a thick, heavy, dark fluid manufactured by the San Paolo gas works of Rome, a by-product obtained in the purification of gas after Bruttini's method. The principal constituent is sulphide of lime.—The experimental plots were 1 square m. in area, the control plot in the center and $\frac{1}{2}$ m. from the others.—Fifty gm. of wheat arti-

ficially "sooted" with spores were used on each plot. The grain was immersed in aqueous solutions (uspulun, 2.5 gm. to 1 l., supersulfo, 10 cc. to 1 l.) for 1 hour, occasionally stirred, the liquid drained off, and the grain dried.—The plots were sown Sept. 12, harvested Aug. 19 following. Results, so far as number and weight are concerned, are given in a table from which it is seen that the control gave 83.8 per cent, supersulfo 22.6 per cent, and uspulun 0.5 per cent of diseased plants. Uspulun proved most effective, being for all practical purposes an absolute fungicide.—It is, however, highly important to observe the superiority of supersulfo over uspulun as far as the yield increase is concerned. Both treatments gave increased yields, indicating their fertilizing value, supersulfo acting the more favorably of the 2 in this respect.—H. T. Güssow.

5122. HURD, ANNIE MAY. Hydrogen-ion concentration and varietal resistance of wheat to stemrust and other diseases. Jour. Agric. Res. 23: 373-386. 1923.—The varieties of wheat resistant to stemrust (*Puccinia graminis tritici* Pers.) employed in the test were: Kanred, Pentad, Khapli, Kota, Mindum, and Iumillo; susceptible varieties: Turkey, Kharkov, Little Club, Preston, Arnautka.—There is no significant difference in the H-ion concentration of juices expressed from resistant and from susceptible varieties. Greater differences are found in a single variety when subjected to differing environmental conditions. The pH value of expressed juice from plants harvested at 1 o'clock in the afternoon is 0.1 higher than from similar plants harvested 4 hours earlier. Juice from plants grown in limed soil has a lower H-ion concentration than that from plants grown in unlimed soil. Plants of unhealthy appearance show abnormally high acidity of expressed juice while plants affected with *Erysiphe graminis* are more acid than healthy ones and, perhaps, for the same reason. Geographic source of seed does not affect the H-ion concentration of the juice of plants.—A compilation of data from various sources shows that there is no correlation between the H-ion concentration of the expressed juices of these varieties of wheat and their resistance or susceptibility to diseases caused by the following organisms: *Puccinia graminis Tritici*, *P. triticea*, *P. glumarum Tritici*, *Tilletia Tritici*, *Urocystis Tritici*, *Gibberella Saubinetii*, *Erysiphe graminis*, and *Tylenchus Tritici*.—D. Reddick.

5123. KASAI, MIKIO. Kurze Mitteilung über den auf der Binse parasitisch lebenden Pilz *Cercosporina juncicola* sp. n. [Note on *Cercosporina juncicola* sp. n. parasitic on *Juncus effusus* var. *decipiens*.] Japanese Jour. Bot. 1: 105-110. 1923.—A stem spot disease of *Juncus* has been known for nearly 20 years in Bingo Province, western Japan; but its cause remained unknown until the author proved as a result of 2 years of study that it is due to *Cercosporina juncicola* Hori & Kasai sp. n. The fungus usually attacks half-grown plants just below the middle of the stem; the spots, which are very small and brownish at first, later enlarge and become sunken. These spots are variable in size and shape, and may be elliptical, circular, or without definite form. A detailed description of the fungus is given. Preventive measures have not yet been worked out, but the planter is urged to set out sound stock only and in doubtful cases to disinfect the stalks but not the roots with Bordeaux mixture. [See also following entry].—Lillian C. Cash.

5124. KASAI, MIKIO. Über den auf der Binse parasitisch lebenden Pilz *Cercosporina juncicola* sp. n. [*Cercosporina juncicola* parasitic on *Juncus*.] Ber. Ohara Inst. Landw. Forsch. 2: 225-232. Pl. 10-12. 1922.—The author describes a disease of *Juncus effusus*, L. var. *decipiens* Buch., a plant which in Japan is used in the mat industry. The fungus attacks half-grown plants causing gray spots which become very conspicuous after the stems are dry. The presence of the fungus on stems materially lessens their value for making mats. On the basis of morphology the author designates the fungus as a new species. Certain recommendations are made for field sanitation and disease control. [See also preceding entry].—Margaret Buwens.

5125. NISIKADO, Y., and C. MIYAKE. Studies on the helminthosporiose of the rice-plant. Ber. Ohara Inst. Landw. Forsch. 2: 133-195. Pl. 3-9. 1922.—This disease, which is serious and widely distributed in Japan, is caused by *Helminthosporium Oryzae* Breda de Haan.

It attacks all parts of the rice plant in all stages of development, and is characterized by brownish leaf-spots and a velvet-like blackening of the culms and glumes. Cultures of the fungus were isolated from different parts of the plant and were grown in rice agar and other culture media, the writers observing particularly the mode of anchorage of the germ tube, the formation of the appressoria, the penetration of the host epidermis, and the effect of the advancing mycelium on the host cells. Penetration may take place either through open stomata or by breaking through the epidermal cells by means of appressoria. Infection hyphae are formed at the tips of the germ tubes. The minimum temperature for the germination of conidia is 2°C. and the maximum 41°C.; the optimum for both germination and mycelial growth is 25–30°C.—Extensive experiments were also conducted to test the germicidal effect of various chemicals on the conidia, mercuric chloride, silver nitrate, copper sulphate, calcium hypochloride, formaldehyde, and phenol proving highly effective. Disinfection of seed with one of these is suggested as a means of control. The taxonomy of the fungus is discussed and a bibliography is given.—*Margaret Bwens.*

5126. REMY, TH., und J. VASTERS. Untersuchungen über die Wirkung von Chlorphenol-Quecksilber, Sublimat und einigen anderen Pflanzenschutz- und Desinfektionsmitteln. [Studies on the action of mercury-chlorphenol, sublimate, and several other substances used for plant protection and disinfection.] Landw. Jahrb. 58: 379–480. Fig. 21–25, 37 tables. 1923.—A detailed study is made of chlorphenol-mercury compound and other disinfectants, including formaldehyde, mercuric chloride, and copper sulphate, for seed treatment against rust and smut spores and against other fungus diseases. A 0.5:1000 concentration of chlorphenol-mercury was sufficient against a moderate infection of wheat with rust, but in the case of strong infection a concentration of 1.5–2.0:1000 was required. Mere moistening of seed with this solution was insufficient for protection. A 0.5:1000 solution proved very efficient against *Fusarium*. The action of the disinfectant against *Gloeosporium lindemuthianum* and *Ascochyta Pisi* proved of doubtful value. The disinfectant compares favorably with formaldehyde, mercuric chloride, and copper sulphate in its influence on seed germination.—*S. A. Waksman.*

DISEASES CAUSED BY BACTERIA

5127. JOHNSON, JAMES. A bacterial leafspot of tobacco. Jour. Agric. Res. 23: 481–493. Pl. 1–4. 1923.—Leaves of tobacco [*Nicotiana tabacum*] of any age may be affected but lesions occur more commonly on the lower ones. The lesions are circular to oblong and vary from 1 mm. to 1 cm. in diameter except through coalescence. The young lesions usually are surrounded by a chlorotic halo.—The bacterial diseases wildfire and angular leafspot have been studied in comparison but “Wisconsin bacterial leafspot” is found to be different. The causal organism is named *Bacterium melleum* n. sp. Its morphological and cultural characters are described in detail, and its group number, according to the system formerly recommended by the American Society of Bacteriologists, is given as 221.3333633.—Infection has been secured artificially only through needle punctures and it is concluded from this and from cultural studies that the organism is not a vigorous parasite but is rather one requiring special conditions for natural infection. High humidity and possibly fairly high temperature are required for infection but these requirements in themselves are not sufficient to insure infection.—Test plats treated with barnyard manure showed 45 per cent diseased plants as compared with 10 per cent on chemically manured plats, thus indicating a predisposing factor that affects occurrence and prevalence.—*D. Reddick.*

5128. KENDALL, ARTHUR ISAAC. Bacterial parasitism, bacterial pathogenism, and resistance to bacterial infection. Jour. Infect. Diseases 32: 341–354. 1923.—Ehrlich's humoral theory and Metchnikoff's cellular theory of immunity are discussed. The differences between the 2 theories are indicated and their relationships respectively to pathogenic and parasitic organisms are pointed out. The author compares the life cycles of these 2 groups of organisms with respect to their host, man.—*R. L. Starkey.*

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

5129. FERRIÈRE, CH[ARLES]. *Entomologie économique. Les problèmes modernes de la lutte contre les insectes et leur application en Suisse.* [Economic entomology. Modern problems of insect control and their application in Switzerland.] 36 p. Ernest Bircher: Berne, 1922.—This paper includes a discussion of agricultural, horticultural, forest, veterinary and medical, industrial and commercial entomology; entomology and the public economy; and entomology in Switzerland.—A bibliography of 2 pages is appended.—*Frederick V. Rand.*

5130. JORDAN, K. H. C. *Die tierischen Schädlinge des Gemüse-, Obst- und Blumengartens und ihre Bekämpfung. Ein Lehrbuch für alle Gartenfreunde.* [The animal enemies of the vegetable, orchard, and flower garden. A handbook for all garden lovers.] xii + 266 p., 88 fig. Oskar Leiner: Leipzig, 1922.—This is a popular handbook discussing, under host groups and specific hosts, the animal parasites of plants.—*Frederick V. Rand.*

5131. NIESCHULZ, OTTO. *Unsere bisherigen Kenntnisse von der Flagellatenkrankheit der Pflanzen.* [Our present knowledge of the flagellate disease of plants.] *Zeitschr. Pflanzenkrankh.* 32: 102–108. 3 fig. 1922.—This recapitulation of present knowledge of flagellates causing plant disease deals mainly with those found in the latex of Euphorbiaceae. Useful literature references are appended.—*H. T. Güssow.*

INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

5132. DOOLITTLE, S. P., and M. N. WALKER. *Cross-inoculation studies with cucurbit mosaic.* *Science* 57: 477. 1923.—In addition to nearly all members of the Cucurbitaceae, the following species have been proved susceptible to this disease: *Martynia louisiana*, *Capsicum annuum* (pepper), *Asclepias syriaca*, *Phytolacca decandra*, *Amaranthus retroflexus*, *Physalis* sp., potato, and tobacco.—*C. J. Lyon.*

5133. GAGET, J. *La dégénérescence des pommes de terre.* [Degeneration of the potato.] *Jour. Agric. Pratique* 35: 316–318. 1921.—The author writes of the connection of aphids with diseases of degeneration such as leaf roll and mosaic and of the difficulty of aphid elimination, and notes the presence of eggs on such diseased tubers, which carry insects through the winter. He asks for a remedy in which seed tubers may be immersed to kill aphid eggs.—*J. P. Kelly.*

DISEASES OF UNKNOWN CAUSE

5134. HINTIKKA, T. J. *Die "Wisa"—Krankheit der Birken in Finnland.* [The "Wisa" disease of birches in Finland.] *Zeitschr. Pflanzenkrankh.* 32: 193–210. 1922.—"Wisa" wood obtained from "Wisa" birches is a wood of abnormally wavy or undulating grain similar to what is known in America as birds' eye wood, or resembling structures such as are found in burls, burl being perhaps the most suitable interpretation of the term "Wisa." Such wood is used in cabinet making.—The author has investigated claims that this abnormality is brought about by fungi, and is of the opinion that the phenomenon is not of parasitic origin, but due to external, climatic, or soil conditions. The changes in structure are said to be caused by an internal gummosis, in which neither cell walls nor contents are dissolved.—*H. T. Güssow.*

5135. KEUCHENIUS, P. E. *Kringrot, een nieuwe Ziekte van Hevea.* [Ringrot, a new disease of Hevea.] *Arch. Rubbercult.* 4: 495–496. 1920.—The disease is common in Sumatra and affects only the outer portion of the bark, which in late stages of the disease dries up and scales off in concentric rings. The cause of the disease is unknown. It may be cured by scraping away the diseased bark, but trees sometimes recover without treatment.—*C. D. LaRue.*

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

5136. ANONYMOUS. [Rev. of: NICOLLE, M., et J. MAGRON. *Les maladies parasitaires des plantes* (infestation-infection). [Parasitic diseases of plants.] 199 p. Masson et Cie: Paris, 1922 (see Bot. Absts. 11, entry 4544).] *Nature* 111: 77. 1923.—This book is prepared chiefly for the medical profession and deals with insect as well as fungus infection. No illustrations are given.—O. A. Stevens.

5137. BERTHELOT, ALBERT, et OSSART. *Sur la pureté des tyrosines commerciales*. [The purity of commercial tyrosins.] *Bull. Soc. Chim. Biol.* 3: 247. 1921.—Examination of 6 samples of commercial tyrosin showed that 2 samples gave a strong biuret reaction and contained large amounts of cystine; a 3rd contained sufficient Ba to completely prevent the development of *Bacillus aminophilus*; and a 4th was merely the crude residue remaining from the manufacture of pancreatic peptone, containing only 20 per cent tyrosin. Only 2 were pure tyrosin (99.7 per cent). The authors emphasize the necessity for chemical and biological examination of commercial tyrosins which are to be employed in bacteriological work.—Joseph S. Caldwell.

5138. BRITTON, W. E., and G. P. CLINTON. *Spray calendar*. Connecticut [New Haven] Agric. Exp. Sta. Bull. 244. 183–226. 1923.—Formulae for 14 insecticidal and 12 fungicidal preparations are given.—A catalogue of the common cultivated plants gives a brief description of the insects and fungi that injure the plant together with the methods of combating the injury. Lists of manufacturers and dealers in spraying machines, insecticides and fungicides are given.—Henry Dorsey.

5139. CARBONE, DOMENICO. *Studi sulle reazioni immunitarie delle piante*. 1. *Introduzione*. [Immune reactions in plants. Introduction.] *Boll. Ist. Sieroterap. Milanese* 2: 261–265. 1922.—It is doubtful whether in green plants a condition of immunity is developed following infection; different investigators have obtained contradictory results. It is still more doubtful whether green plants are capable of opposing to the action of microorganisms proteins with immunizing reactions comparable to those of animals. It is possible that actions of this nature may be simulated or masked by non-specific reactions.—Lillian C. Cash.

5140. CARBONE, DOMENICO, e ITALO CORTESE VIGLIANO. *Studi sulle reazioni immunitarie delle piante*. 2. *Sulle presenza nelle piante di sostanze agglutinanti, precipitanti, emolizzanti ed antiemolitiche*. [The presence in plants of agglutinating, precipitating, hemolytic and antihemolytic substances.] *Boll. Ist. Sieroterap. Milanese* 2: 267–274. 1922.—Some plant saps have been studied to determine their ability to agglutinate microorganisms, and the following have given positive results for some microorganisms: *Armillaria mellea*, lemon fruit, onion bulb, root of *Stachys* and of carrot, cabbage leaves, spinach, celery, goat's-beard, and cladodes of *Opuntia*. The lemon fruit, cladodes of *Opuntia*, celery leaves, and onion bulbs caused a precipitate in horse serum. *Armillaria mellea* was found to possess a hemolytic action on red blood corpuscles of sheep. Lemon fruit, leaves of endive, spinach, chicory, cladodes of *Opuntia*, roots of *Stachys*, and potato tubers had an antihemolytic action. Lemon fruit, leaves of endive, spinach, chicory, cabbage, egg-plant, cauliflower, potato tubers, and onion bulbs agglutinated the red blood corpuscles of sheep.—The degree of agglutinating action differed in the same plant for different bacterial species. Probably there are agglutinating principles filterable through paper but not through clay filters.—The hemolyzing principle of *Armillaria mellea* and the hemagglutinating and antihemolytic principles of potato are not affected by boiling, the latter is active at 37°C. but not at 13–15°C. The hemagglutinating principle of endive is filterable through a clay filter, the antihemolytic principle is not; both can be filtered through paper.—The above described reactions can all be simulated or masked in some plants; but it is always possible and even easy to select plants and antigens in which the reciprocal action is such that the tests are free from the causes of error, which up to the present have vitiated the results of experiments on the immunizing reactions of plants.—These tests were made upon bulbs and young spring shoots. The authors propose to repeat the work using mature plants.—Lillian C. Cash.

5141. EWING, JAMES. *Neoplastic diseases. A treatise on tumors.* 1054 p., 514 fig. W. B. Saunders: Philadelphia & London, 1922.

5142. KONING, M. DE. *Boschbescherming. De leer der ziekten en beschadigen onzer Nederlandsche bosschen.* [Forest protection. Diseases and injuries in Dutch forests.] xiv + 567 p., 385 fig. (5 unnumbered). W. H. Thieme & Cie: Zutphen, 1922.—After a discussion of the question: "What is forest protection?" the author gives a review of the history of plant pathology, laws relative to plant pathology, etc., in the Netherlands, with special reference to forest protection.—The book may be divided into 4 principal parts, treating the following subjects: (1) troubles caused by weather conditions, as cold, heat, precipitation, wind, storm, and lightning, each of which is treated and illustrated in detail; (2) troubles caused by environment, e.g., conditions of soil, air, and light; (3) troubles caused by plants, e. g., weeds, algae, and fungi. The latter are treated in considerable detail. In each case the common and scientific names of the fungus are given, followed by a clear semipopular description, with a discussion of control; (4) troubles caused by animals, the latter being divided according to the usual classification. Each animal and the damage it causes are described; likewise, means of control and prevention. The insects are treated extensively. The last 2 chapters discuss the injuries caused by man and by unknown causes.—An index concludes the book.—*Peter J. Klaphaak.*

5143. SCHMIDT, E. W. *Ueber die Voraussetzungen zu einer erfolgreichen Bekämpfung von Pflanzenkrankheiten.* [The requirements for a successful control of plant diseases.] Zeitschr. Pflanzenkrankh. 32: 293-303. 1922.—The author concludes his discussion of prophylaxis and therapy of disease with the following essential points: (1) the use of really suitable chemical substances, and, if possible, specifics against the respective diseases; (2) intensive treatment with sufficient quantities of the efficient composition of the specific used; (3) use at the most opportune period, i. e., (a) under suitable weather conditions (b) (as far as this refers to the respective causal agents) at the correct biological moment.—*H. J. Güssow.*

5144. WELLS, B. W. *Fundamental classification of galls.* Science 57: 469-470. 1923.—The author objects to Cook's statements [see Bot. Absts. 12, Entry 3452] as to the classification of galls made by Küster. The latter did not classify galls on the basis of the presence or absence of cell differentiation.—*C. J. Lyon.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 4768, 4771, 4802, 5190)

5145. BALLARD, C. W. *Histology of Cocillana and substitute barks.* Jour. Amer. Pharm. Assoc. 11: 781-787. Fig. 1-4. 1922.—Macroscopical and microscopical descriptions are given of 4 samples of Cocillana: (1) the genuine Cocillana, *Guarea Rusbyi*; (2) substitute Cocillana, *G. Bangii*; (3) substitute Cocillana, *Guarea* sp.; (4) substitue Cocillana, *Nectandra* sp. The descriptions are supplemented with drawings of their respective transverse sections and powdered samples. *Guarea Bangii* resembles true Cocillana more closely than the other 2 substitutes, but differs from it sufficiently to render its identification simple. The other 2 substitutes differ greatly from the genuine Cocillana in appearance and physical characters.—*Anton Hogstad, Jr.*

5146. BLACK, O. F., J. W. KELLY, and W. W. STOCKBERGER. *A chemical examination of Venezuelan jaborandi.* Amer. Jour. Pharm. 95: 4-7. 1923.—The authors report 0.04 per cent of alkaloid in the leaves of Venezuelan jaborandi which responds to tests for pilocarpine. This plant, which is locally known as "borrachera" on account of the intoxicating effect of

its leaves upon animals, was provisionally named by Ernst in 1883 *Pilocarpus heterophyllus* A. Gray, a species discovered about 1857 by Wright in Cuba. The plant grows in dry hot localities in the vicinity of Barquisimeto.—Anton Hodstad, Jr.

5147. BOURQUELOT, EM. Les principes actifs de quelques plantes employées en médecine populaire; leur recherche par la méthode biochimique. [The active principles of certain plants employed in popular medicine; their study by biochemical methods.] Bull. Soc. Chim. Biol. 3: 71-84. 1921.—In this posthumous paper the author describes his method of detection and isolation from plant material used in popular medicine of glucosides hydrolyzable by emulsin and summarizes previously published results of its use. *Sambucus nigra* is employed in popular medicine, the bark as a diuretic and purgative and the infusion of the flowers in the treatment of angina and pulmonary catarrh. All parts contain a cyanogenetic glucoside, sambunigrin, hydrolyzed by emulsin to glucose, benzaldehyde, and hydrocyanic acid. Leaves and bark contain large amounts of potassium nitrate, which explains their diuretic properties. Leaves of *Prunus Laurocerasus* contain prulaurasin, an isomer of sambunigrin. Bark and shoots of *P. padus* contain a second isomer, glucoprunasin or amygdonitrile-glucoside. *Plantago major*, *P. media*, and *P. lanceolata* were recommended by Galen as a cure for dysentery and the crushed leaves are popularly used as poultices for bee and wasp stings. The leaves contain aucubin, as do the seed of *Aucuba japonica*, which is hydrolyzed by emulsin to glucose and aucubigenine and which is without physiological effect. The leaves of *Taraxacum officinale*, reported to be poisonous, contain taxicatin, hydrolyzed by emulsin to glucose and a phenol. Its physiological effects have not been investigated. *Verbena officinalis*, formerly regarded as an universal panacea and still employed as a cataplasm for contusions and in pleurisy, contains verbenalin, hydrolyzed by emulsin to glucose and a phenol which oxidizes to a yellowish brown color. It is without physiological effect. *Olea europaea* contains in stems, leaves, and fruit an amorphous bitter glucoside, oleuropein, which progressively decreases in amount as the fruits mature and is entirely removed by the treatment given them in preparing them for food. Leaves and young fruits have been used in lieu of quinine as an astringent tonic and in intermittent fevers. *Erythraea Centaurium* has a place in almost all European pharmacopoeias, the flowering shoots having long been employed as a tonic and febrifuge. The glucoside present is erythraurin; its physiological effects have not been studied. *Menyanthes trifoliata*, popularly used as a tonic, febrifuge, antiscorbutic, emmenagogue, and vermifuge, contains menyanthin, isolated by Kromayer, and meliatin, neither of which has been studied as to physiological effects. *Hepatica triloba* contains hepatrilobin. *Scabiosa succisa*, employed as a sudorific, detergent, depurative, and as a wash in leprosy and skin diseases, contains scabiosin. Other glucosides isolated in the same laboratory from plants which are not used in medicine are jasmiflorin from *Jasminum nudiflorum*, bakankosin from *Strychnos* seed, arbutin from many varieties of pear, and loroglossin from *Loroglossum hircinum* and other indigenous orchids. In Bourquelot's laboratory 281 species have been examined for the presence of glucosides, with positive results in 205; from 56 of these the glucoside has been isolated. Among plants popularly employed in medicine and included in many pharmacopoeias and which are known to contain glucosides not yet isolated and studied are *Vincetoxicum officinale*, *Sambucus Ebulus*, employed in gout and rheumatism. *Lonicera periclymenum*, used in coughs, *Ajuga Chamaepitys*, an aperient and vulnerary, *Teucrium montanum*, used in insect stings, *Anthyllis vulneraria* and *Melilotus officinalis*, employed as resolutive, *Ononis spinosa*, diuretic, *Aquilegia vulgaris*, antiscorbutic, *Helleborus foetidus*, vermifuge, *Ranunculus bulbosus* and *R. repens*, as external caustics, *Asperula odorata*, *Veronica chamaedrys*, and *V. officinalis*, as tonics and vulneraries, and *Scrophularia nodosa*, as a resolutive.—Joseph S. Caldwell.

5143. BOURQUELOT, EM., et M. BRIDEL. Sur un nouveau glucoside hydrolysable par l'émulsine; la scabiosine. [On scabiosine, a new glucoside hydrolyzable by emulsin.] Bull. Soc. Chim. Biol. 2: 119-124. 1920.—*Scabiosa Succisa* (Dipsaceae) is widely employed in popular medicine in France in lung and skin diseases and especially in itch. The root contains a laevorotatory glucoside (named scabiosin) which is hydrolyzed by emulsin or by dilute sulphuric acid to glucose and an unidentified yellowish water-soluble body.—Joseph S. Caldwell.

5149. CHEN, K. K. **Phytochemical notes. No. 91. Cassia oils from leaves and twigs.** Jour. Amer. Pharm. Assoc. 12: 294-296. Pl. 1. 1923.—Three bales of leaves and 2 of twigs of *Cinnamomum cassia* Blume, imported from China, were subjected to distillation and cohabitation. The 288 pounds of leaves yielded 658.7 gm. (0.52 per cent) of oil with a density of about 1.054 at 22°C. The 174 pounds of twigs yielded 715.5 gm. of oil (0.9 per cent) with a density of about 1.047.—Anton Hogstad, Jr.

5150. COUCH, JAMES F. **The toxic constituent of greasewood (*Sarcobatus vermiculatus*).** Amer. Jour. Pharm. 94: 631-641. 1922.—Chemical examination revealed large amounts of sodium and potassium oxalates, these being responsible for cases of range poisoning. Toxic alkaloids, glucosides, saponins, hydrocyanic acid or its compounds were not found. The material examined was collected near Salina, Utah.—Anton Hogstad, Jr.

5151. DOWZARD, EDWIN. **Note on the toxicity of castor seed.** Jour. Amer. Pharm. Assoc. 12: 116-117. 1923.—In experiments with guinea pigs the author finds the toxicity to be about 0.179 gm. per kgm. of guinea pig. In the same proportions about 12.2 g. of castor seed would prove fatal to a man weighing 150 pounds.—Anton Hogstad, Jr.

5152. GERLACH. **Zur Lupinenentbitterung. [On removing the bitter principle from lupines.]** Mitteil. Deutsch. Landw. Ges. 38: 220. 1923.—This note gives the loss of protein resulting from 2 methods of treating lupine seed to remove the bitter principle. When first treated with cold water the loss of crude protein was 28.2 per cent; when treated with boiling water, 18.2 per cent.—A. J. Pieters.

5153. GORIS, A. **Sur les constituants des essences de primevère. [The constituents of *Primula* essence.]** Bull. Soc. Chim. Biol. 1: 163-170. 1919.—The roots of *Primula officinalis* Jacq. contain 2 glucosides, primeverin and primulaverin, the composition and structural formulae of which have been determined. The essence of *Primula* obtained by distillation of the roots consists of a solid methyl ester of β -methoxyresorcylic acid derived from primeverin and a liquid methyl ester of metamethoxysalicylic acid derived from primulaverin. The glucosides are not split by emulsin, invertin, or yeast extract, but are hydrolyzed by an enzyme contained in the sepals of this and other species of *Primula*, and which may be identical with betulase and gaultherase since it also hydrolyzes the glucosides of *Monotropa*, *Betula*, and *Gaultheria*. Hydrolysis of primeverin and primulaverin by the enzyme yields a new disaccharide, primeverose, made up of 1 molecule each of glucose and xylose.—Joseph S. Caldwell.

5154. HART, FANCHON. **The histology of Vilca bark.** Jour. Amer. Pharm. Assoc. 11: 906-909. Fig. 1-3. 1922.—The author presents a gross and a histological description of the bark of *Piptadenia macrocarpa* from South America with drawings of the cellular elements and contents. The bark contains a large percentage of tannin, calcium oxalate, and resin. It has been used for tanning and for the fermentation of cane juice. Rusby encountered the trees on the central slopes of the eastern Bolivian Andes at an elevation of 3000-5000 feet. The usual height of the tree is 40-80 feet, and the trunk diameter 1-2 feet. It is instantly recognized by its conspicuous warty bark.—Anton Hogstad, Jr.

5155. HUERRE, R. **Action des hydracides sur l'essence de *Juniperus oxycedrus*. Chlorhydrate, bromhydrate, iodhydrate de cadinene. [Action of hydracids on the essence of *Juniperus oxycedrus*. Hydrochloride, hydrobromide and hydriodide of cadinine.]** Bull. Soc. Chim. Biol. 2: 239-246. 1920.—The essence obtained by distillation of the wood with water, when treated with gaseous HCl, HBr, or HI in the usual way, yields hydrochloride, hydrobromide, or hydriodide of l-cadinine identical with those obtained from the official oil of cade. The amount of l-cadinine present in the essence is between 21 and 30.6 per cent.—Joseph S. Caldwell.

5156. MASUCCI, PETER, and GEORGE A. SLOTHOWER. **Some physical and chemical properties of Neorobin.** Jour. Amer. Pharm. Assoc. 12: 335-338. 1923.—Neorobin, a derivative of

chrysarobin made by dissolving chrysarobin in glacial acetic acid and subsequently reducing with metallic tin, was found to be 50 per cent more active than chrysarobin, using the reduction of ammoniacal silver nitrate as a criterion of reducing power. Therefore it should be at least 50 per cent more active therapeutically. Neorobin may be differentiated from chrysarobin by dissolving in acetone, the former producing a golden yellow, the latter a dark red solution. Neorobin was found to be neither a tin compound nor a complex acetate.—*Anton Hogstad, Jr.*

5157. MUNESADA, T. Über den Farbstoff der Frucht von *Gardenia florida* L. (Gelbschote). [The pigment in the fruit of *Gardenia florida*.] Ber. Ohara Inst. Landw. Forsch. 2: 219-223. 1922.—From a study of the physical and chemical properties of the substance, the author believes it to be crocin.—*Margaret Buens.*

5158. RIPERT, JEAN. Sur la variation et le rôle des alcaloides de la belladonna. [On the variation and rôle of belladonna alkaloids.] 152 p., 20 pl. Oberthür: Rennes, 1922.

5159. RUSBY, H. H. Some interesting medicinal plants of Bolivia. Jour. Amer. Pharm. Assoc. 11: 775-781. 1922.—The introduction, dealing with the history of coto and para coto barks, is followed by the author's findings concerning these barks on his recent trip to South America. Several barks were collected; "Coto Piquante" or "Coto Fino" appears to be the genuine coto, which the author has named with some slight admission of doubt *Nectandra coto*, and the spurious one *Ocotea pseudo-coto* [see Bot. Absts. 12, Entry 2215]. The real para coto was not found. O. E. WHITE submits with the article an account of the discovery of these trees.—The 2nd part deals with Cocillana or Guapi bark and its substitutes, the history of which is reviewed. Four specimens are considered: (1) Guapi or Cocillana "A," the original and genuine article, *Guarea Rusbyi*; (2) Guapi or Cocillana "B," the spurious article that has occurred in commerce, *Guarea Bangii*, a new species [see Bot. Absts. 12, Entry 2215]; (3) Guapi or Cocillana "C," also spurious, pertaining to a large tree of the laurel family, probably a species of *Nectandra*; (4) Guapi or Cocillana "D" also spurious, and pertaining to an undetermined species of *Guarea*.—*Anton Hogstad, Jr.*

5160. SCHEPPEGRELL, WILLIAM. Hayfever and asthma. 274. p., 1 colored pl., 107. fig. Les & Febiger: Philadelphia, 1922.—Hayfever is caused by the pollen of certain common anemophilous plants. Among the common hayfever plants of the eastern and southern U. S. A. may be mentioned *Ambrosia elatior*, *A. trifida*, *A. psilostachya*, *Xanthium americanum*, *Salsola pestifer*, various oaks, *Juglans nigra*, *Salix*, the Gramineae, etc. From the Pacific and Rocky Mountain States, the Artemisias (*A. heterophylla*, *A. tridentata*, etc.) give the most severe reactions. Contrary to an old belief Solidago, although its pollen gives a positive reaction, is not a cause of hayfever since it is not wind-borne. To establish the responsibility of a plant for hayfever, botanical and biological tests are required. Among the subjects considered are the history and prevalence of hayfever, the forms and chemical composition of pollen, principal hayfever plants in the U. S. A., common plants not responsible for hayfever, anatomy and physiology of the nose, diagnostic tests of hayfever, hayfever seasons, atmospheric conditions, etiology, classification of many hayfever plants into 4 great groups (Ambrosiaceae, Gramineae, Chenopodiaceae, and the Artemisia group), a list of the plants tested for hayfever reactions at the laboratory of the American Hayfever Prevention Association, with results, prevention of hayfever, treatment, immunization, and hayfever resorts.—*H. W. Fougken.*

5161. SCHWARZ, L. J. A brief review of the crude drugs entered at the port of New York during the part year. Jour. Amer. Pharm. Assoc. 12: 200-204. 1923.—This report from the Pharmacognosy Laboratory in the New York Station of the U. S. Bureau of Chemistry reviews the examination of approximately 3,500 shipments of crude drugs. Detention action was recommended on 210 shipments. Contrary to the common belief that the importations were of unusually poor grade, there was an improvement in the quality of crude drugs imported during the past few years. Individual shipments are discussed.—*Anton Hogstad, Jr.*

5162. SEIL, HARVEY A. **Composition of *Nectandra coto* Rusby sp. nov. Preliminary report.** Jour. Amer. Pharm. Assoc. 11: 904-906. 1922.—The sample was collected by Rusby in South America. The cotoin separated and purified melted at 127-128°C. (uncorrected); gave a brown-black coloration with ferric chloride; and, dissolved in glacial acetic acid to which a few drops of concentrated nitric acid are added, gave a blood-red color. Therefore *Nectandra Coto* is a true coto. Two new alkaloids were found, parostemine, a non-phenolic alkaloid, and parosteminine, a phenolic alkaloid, both names being derived from *Parostema*, the sub-genus of *Nectandra* to which coto belongs. Ether extract 24.83 per cent; volatile oil 1.89 per cent; and ash 1.67 per cent.—*Anton Hogstad, Jr.*

5163. STOCKBERGER, W. W. **Status of drug-plant growing in the United States in 1921.** Jour. Amer. Pharm. Assoc. 12: 120-122. 1923.—The year 1921 brought to a close the cultivation of many medicinal plants in America, which had had considerable success during the war years. A sharp decline was met in the case of *Cannabis*, although a small amount (some 25 acres) was under cultivation during this time. Cultivation of sage almost reached the vanishing point because the home-grown material did not fall within the limits for total and acid-insoluble ash. The exported crop of ginseng was valued at \$974,097, representing about 157,351 pounds of both wild and cultivated roots. Twenty-six educational institutions maintained drug gardens, one of them devoting considerable study to poisonous plants, another to the biochemistry of the mints.—*Anton Hogstad, Jr.*

5164. WHERRY, EDGAR T., and GEORGE L. KEENAN. **Occurrence and forms of calcium oxalate crystals in official crude drugs.** Jour. Amer. Pharm. Assoc. 12: 301-318. Fig. 1-2. 1923.—The authors seek to (1) ascertain whether the crystals in every case possess the optical properties of ordinary (monohydrate) calcium oxalate; (2) identify any having different properties and to work out the crystallographic orientation of each type of calcium oxalate crystal represented. The technical crystallographic data have been reviewed by WHERRY, E. T., Jour. Washington [D.C.] Acad. Sci. 12: 196-200. 1922.—Various forms are reported besides monohydrate calcium oxalate, viz., tetragonal calcium oxalate, monohydrate magnesium oxalate, and potassium hydrogen oxalate. In a few drugs, e.g., *agaricus*, *belladonna*, *myristica*, crystals with properties unlike those of any thus far described were observed; the nature of these has not been determined.—The powdered samples were examined by the immersion method, the liquid used consisting of monobromnaphthalene to which a very little monochloronaphthalene was added, the mixture having a refractive index of 1.650.—*Anton Hogstad, Jr.*

5165. WIRTH, ELMER H. **Pharmacognosy, today and tomorrow.** Editorial. Jour. Amer. Pharm. Assoc. 12: 196-197. 1923.—The author emphasizes that the pharmacognostic field is being rapidly invaded by the chemist through microchemistry, which should rightly belong to the pharmacognocist, and sounds the warning that if pharmacognosy is to be preserved more attention will have to be given to the chemistry of drugs.—*Anton Hogstad, Jr.*

5166. YOUNGKEN, H. W. **A review of the literature in pharmaceutical botany and pharmacognosy for 1921-1922. (August 1, 1921-August 1, 1922).** Jour. Amer. Pharm. Assoc. 12: 122-129. 1923.—The literature is divided into 7 sections: morphology, drug cultivation, micro-analytic and microchemic methods, drug adulteration and substitution, plant chemistry, ash determination, and history. References are made to some 200 articles.—*Anton Hogstad, Jr.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*WILLIAM J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 4734, 4735, 4745, 4748, 4765, 4808, 4813, 4814, 4815, 4823, 4827, 4836, 4843, 4857, 4954, 5008, 5026, 5030, 5032, 5033, 5039, 5065, 5076, 5083, 5084, 5086, 5087, 5100, 5122, 5126, 5128, 5137, 5139, 5147, 5148, 5152, 5153, 5155, 5157, 5164, 5258, 5260, 5265, 5267, 5269, 5270)

GENERAL

5167. CZAPEK, FRIEDRICH. *Biochemie der Pflanzen*. [Biochemistry of plants.] 2nd. ed. Vol. 2, *xii* + 541 p. 1920; Vol. 3, *ix* + 852 p. 1921. Gustav Fisher: Jena.—The first volume of the revised edition of this elaborate work was published in 1913, and contained a treatment of the special and general biochemistry of carbohydrates, fats, and fat-like substances, together with an account of the metabolism of these groups of constituents. Subsequent to the close of the war revision proceeded to the completion indicated, in 1920 and 1921. In revising volume 2 of the old edition the immense accumulation of new material necessitated an additional volume. The material in the present edition is distributed as follows: Volume 2 contains the account of proteins and protein metabolism in all groups of plants, this treatment occupying 321 pages. The remainder of the volume is devoted to the mineral constituents of plant organs and products (205 pages). Volume 3 is subdivided into 3 major parts devoted especially to biochemistry of dissimilation. The 1st is devoted to respiration phenomena, the 2nd to nitrogen-containing excrete products and by-products of metabolism, and the 3rd to the metabolism of nitrogen-free cyclic compounds. It will be seen that the topics just mentioned are relatively more completely elaborated than any other aspect of the work, although an immense amount of new material is incorporated under practically every section. The work is distinctively encyclopedic, though unfortunately conditions arising from the war have obviously made it impossible for the author to incorporate the results of a considerable amount of work done especially in England and America.—*B. M. Duggar*.

5168. FITTING, H. *Aufgaben und Ziele einer vergleichenden Physiologie auf geographischer Grundlage*. [Problems and aims of comparative physiology based on geography.] Address on becoming Rector of the University at Bonn on the Rhine, Germany. 42 p. Gustav Fischer: Jena, 1922.—The title of this address does not indicate what is especially emphasized, namely the knowledge on the part of the physiologist of what formerly was called physical geography, and that "typical" plants do not exist, but that, instead, each individual, or at least individual species, represents the resultant of inherited substance acted upon by environment. While the address resembles an essay in ecology, Fitting's physiological training and experience cause him to point out both the limitations of laboratory physiology and the inadequacy of climatology, soil science, and the other components of ecology, except as the painstaking student may determine the constituents of the actual immediate surroundings of the individual plant. Physiological analysis both of the individual plant and of the space which it occupies leads Fitting to discard the theory of bog-xerophytism, and to recognize that current explanatory hypotheses regarding salt plants, lime plants, and other special plants lack the support of experimental investigation. He commends American studies, particularly Cannon's, of the root systems of desert plants. He reports his own and the researches of others on the moisture content of the various layers of desert soils, and on the concentration of cell-sap, and shows that the concentration of the latter is ample to account for the absorption of water by desert plants. He asserts that cell-sap concentration, which is not always due to salt concentration, is invariably more or less proportional to the degree of dryness of the soil.—*George J. Peirce*.

5169. MOLISCH, HANS. *Mikrochemie der Pflanze*. [Microchemistry of plants.] 3rd ed., 438 p., 135 fig. Gustav Fisher: Jena, 1923.—The revised edition of this work is not signalized by any significant departures, but as contrasted with the 1st edition particularly there is a more extensive treatment of pigments of chromatophores, especially chlorophyll. Much of the more recent work on carotinoids is not included. In the group of anthocyanins the new data considered are almost exclusively German. Subsidiary recent work on chromogens is included in a few paragraphs. Otherwise, one notes few changes except in details of technique and in the inclusion of a few additional glucosides and alkaloids.—*B. M. Duggar*.

5170. WEISS, O. *Grundriss der Physiologie. Zweiter Teil. Biophysik*. [Outline of physiology. Part II, biophysics.] 454 p., 170 fig. Georg Thieme: Leipzig, 1919.—The first part of this work, by Carl Oppenheimer, was concerned with biochemistry [see Bot. Absts. 12, Entry 2721]. In the present volume, after a preliminary chapter of very general nature, the following topics are discussed: physiology of the nerves, movement, production of electricity, luminescence, special physiology of movement, physiology of the central nervous system, physiology of the sense organs, and a brief chapter on temperature and heat production in the body. Plant material is not discussed except incidentally.—*Grace E. Howard*.

DIFFUSION, PHYSICO-CHEMICAL PHENOMENA

5171. BIRCUMSHAW, LOUIS LEIGHTON. The transition from the colloidal to the crystalloidal state. Solutions of potassium oleate. *Jour. Chem. Soc. [London]* 123: 91-97. 3 fig. 1923.—Although potassium oleate forms a colloidal solution in water, in alcohol it gives a non-associated and non-dissociated solution. A study was made of the behavior of potassium oleate in mixtures of alcohol and water, the density, viscosity, and surface tension being measured in a complete series from pure alcohol to pure water. Heretofore it has been assumed that the transition from colloid to crystalloid takes place gradually. "The experimental results suggest that there are 3 stages in the breaking down of the colloidal aggregate."—*F. E. Denny*.

5172. BROOKS, S. C. Conductivity as a measure of vitality and death. *Jour. Gen. Physiol.* 5: 365-381. Fig. 1. 1923.—The conductance of *Laminaria*, *Saccharomyces*, *Bacillus coli* and *B. butyricus*, *Chlorella*, and of red blood cells has been studied by the electrolytic method of the author and that of Osterhout. Both methods show that conductance of living tissue is closely proportionate to, and determined by, that of the surrounding fluid with which it is apparently in equilibrium. A quantity is defined which is independent of the conductivity of the fluid bathing the tissue. This is called the "net conductance."—*O. L. Inman*.

5173. HERBST, HEINRICH. Über die Adsorption durch Kohlenstoff. [On the adsorption by carbon.] *Biochem. Zeitschr.* 115: 204-219. 1921.—The writer draws the conclusion from his work that in order to know the adsorptive value of any carbon one should know 4 characteristics of it, namely, the purity, as the activity increases with increase in purity; the porosity, upon which the rate of adsorption depends; the ultraporosity loss, dependent upon the size of molecules being adsorbed, to which loss the apparent activity is related; and graphitization, by which is meant that when amorphous carbon is heated to 1200°C. it changes to graphite and its adsorbing power is greatly reduced. In explanation it may be said that the writer speaks of the "true" activity of a carbon as the activity shown in the adsorption of gases of small molecules as N₂, H₂, and CO₂; the "apparent" activity as that shown with larger molecules, and the difference between them he calls the ultraporosity loss. This loss increases as the size of the adsorbed molecules increases. By ultraporosity he means the spaces between the molecules of the adsorbent. If large molecules are being adsorbed the surfaces between the ultimate carbon molecules are not being utilized and the adsorbing surface is reduced with a consequent reduction.—*F. G. Gustafson*.

5174. KELLER, RUDOLF. Dielektrizitätskonstanten biochemischer Stoffe. [Dielectric constants of biochemical substances.] *Biochem. Zeitschr.* 115: 134-158. 1921.—The author presents arguments in favor of his view that the behavior of most substances of biochemical importance is determined by their dielectric constants, which in turn determine the sign of their charges against water or other biochemical substances. Ionic reactions among molecules of small dimensions and among aggregates of such molecules may be important, but the author considers that disparity in size precludes ionic reactions between molecules of substances such as proteins among themselves or with typical crystalloids; the theory of H-ion concentrations is particularly attacked as being entirely unfounded and misleading. Isoelectric points are stated to be governed by surface potential differences which follow Coehn's Law. The chemical nature of dyes is supposed to have little effect on their staining reactions, which are determined by dielectrically produced charges.—On the basis of the author's theory, movement of water in tissues should be from "anodic" towards "cathodic" regions: secreting organs, e.g., sweat glands, stomach epithelium, kidney glomeruli, and plant leaves are anodic, the exceptions being pancreas and salivary glands, yielding alkaline fluids; while absorbing organs are cathodic, e.g., intestinal epithelium, convoluted tubules of the kidney, roots. Fats do not behave in the intestine as predicted.—Dielectric constants of 18 substances including carbohydrates, proteins, lipoids, dyes, serum, etc., are given, but are shown not to furnish conclusive evidence as to the reactions of these substances in living matter.—*S. C. Brooks.*

WATER RELATIONS

5175. BOBILIOFF, W. Onderzoekingen over de transpiratie van *Hevea brasiliensis*. [The transpiration of *Hevea brasiliensis*.] *Arch. Rubbercult.* 4: 498-531. 1920.—Many hydathodes which give off water at night are present on the lower side of the leaves of *Hevea*. Light is the chief factor influencing transpiration and there is almost no transpiration at night. Temperature has more effect on transpiration at low temperatures than at higher ones. The effect of humidity on transpiration is slight. In direct sunlight, rapid transpiration takes place even in a very humid atmosphere. Wind is a factor of great importance. When leaves are wet some water may be absorbed by them. Leaves which become dry after having been wet show a pronounced increase in transpiration rate. The stomata open in light and close in darkness. Transpiration is one of the chief factors influencing yield of latex.—*C. D. LaRue.*

5176. BOSE, J. C. The physiology of the ascent of sap. 277 p., 93 fig. Longmans, Green and Co.: London. 1923.—The object of this work is an attempt to formulate upon experimental evidence a comprehensive theory for the ascent of sap. Various present-day theories are given and each one shown to be lacking in some important detail.—Several appliances of great sensitiveness are described for the purpose of making measurements of the change in the rate of the ascent of sap caused by some physiological variation. For example, responsive movements induced by the ascent of sap are recorded by an apparatus in which the indicating leaf is attached by a thread to a magnifying lever made of fine glass fiber. The lever itself is mounted on jewel bearings. Interesting methods are given for the determination of transpiration rates.—These investigations lead the author to conclude that the ascent of sap is due to the pulsatory activity of definite layers of cells in all parts of the body of the plant, the exact positions of which have been located in 3 regions, namely, the absorbing root, the conducting stem, and the excreting leaf.—*Grace E. Howard.*

5177. HARLAN, HARRY V., and MERRETT N. POPE. Water content of barley kernels during growth and maturation. *Jour. Agric. Res.* 23: 333-360. 1923.—A complete daily record of dry weight and percentage of water in individual kernels of barley [*Hordeum*], varieties Jet and Baku, from flowering to maturity is presented in graphs, tables, and frequency tables.—Immediately following flowering, the kernels show almost identical water content for any 1 day and almost identical daily increase in water content for many days. The range is from about 80 per cent to about 42 per cent. When the latter stage is reached no further deposition of starch occurs and the kernels dry very rapidly.—In Jet, a black pigment develops as deposition of starch ceases so that the progress of ripening is evident.—*D. Reddick.*

5178. POOL, RAYMOND J. **Loftfield on stomata.** [Rev. of: LOFTFIELD, J. V. G. *The behavior of stomata.* Carnegie Inst. Washington Publ. 314. 104 p., 16 pl., 54 fig. 1921 (see Bot. Absts. 11, Entry 1903).] *Science* 57: 418-420. 1923.

MINERAL NUTRIENTS AND SALT RELATIONS

5179. BAKKE, A. L., and L. W. ERDMAN. **A comparative study of sand and solution cultures of Marquis wheat.** *Amer. Jour. Bot.* 10: 18-31. 1 fig. 1923.—A comparison is made of the growth of Marquis wheat in sand cultures and in water cultures, when supplied with Solution III of the National Research Council series; and a determination of the best proportion of the salts KNO_3 , $\text{Ca}(\text{H}_2\text{PO}_4)_2$, and MgSO_4 . Shive's solution IR_3C_2 was used as a control. The total absorption, the growth of roots and tops, and the change in the H-ion concentration of the media after a $3\frac{1}{2}$ -day period of plant growth therein were recorded. The solutions giving the highest yield in sand were found to be quite different in their salt proportions from those giving the highest yield in water culture. The highest yield in both cases was markedly superior to Shive's R_6C_2 solution. The highest amount of absorption and the maximum green and dry weight of tops occurred in water culture, but the greatest root development in sand. In general, those cultures having the greatest transpiration for the entire growth period also showed the greatest dry weight of tops and of roots. The reaction of the medium in which the plants were grown changed from an average acidity of pH 3.75 before growing the cultures to one of pH 5.94 (for water cultures) and of pH 6.66 (for sand cultures), after growing the plants for one $3\frac{1}{2}$ -day period. No correlation could be shown between the total yield of cultures and their corresponding H-ion concentrations.—E. W. Sinnott.

5180. CANALS, E. **De l'action des sulfate de magnésium sur le développement de la racine et de la tige.** [Action of magnesium sulphate on development of stem and root.] *Bull. Soc. Chim. Biol* 2: 138-139. 1920.—Peas, lupines, beans, and corn were germinated in distilled water and transferred to Detmer's solution in which calcium had been replaced by varying amounts of MgSO_4 . As the amount of magnesium was increased, injury to the root appeared but was accompanied by stimulation of stem growth. This stimulation increased until the amount of magnesium present was 2-5 times that at which injury to roots appeared. In the higher concentrations geotropism was reversed and the roots turned upward out of the solution or grew horizontally along its surface. The addition of calcium enabled the roots to endure about twice as much magnesium without discoverable injury and there was a corresponding increase in the concentration at which maximum stimulatory effect upon tops was observed.—Joseph S. Caldwell.

5181. DAVIS, A. R., D. R. HOAGLAND, and C. B. LIPMAN. **The feeding power of plants.** *Science* 57: 299-301. 1923.—In answer to the theory set forth by Truog in 1922 [see Bot. Absts. 12, Entry 1424] and in previous publications the authors point out several objections. Truog assumed that specific absorbing powers of root cells cause differences between plants, but he failed to take into account the effect of the differences in extent of root system and in the amount and intensity of CO_2 excretion by the roots. Objections are raised to the application of the law of mass action to the absorption of ions of nutritive substances such as potassium. Many studies have shown that the ions are not precipitated in the cell, leaving a low concentration in the cell sap, as would be required if the law of mass action is to affect the case. Neither can the changes in pH of the cell sap be regarded as any controlling influence, since most studies show the pH to vary only within a very narrow range.—C. J. Lyon.

5182. IRWIN, MARIAN. **The behavior of chlorides in the cell sap of *Nitella*.** *Jour. Gen. Physiol.* 5: 427-428. 1923.—A method is described for determining the chloride content in less than a drop of the cell sap of *Nitella*. The sap shows a concentration of chloride of 0.128 M and the accumulation can be followed during the growth of the cell. The chloride concentration in the cell sap does not increase when the cell is placed for 2 days in solutions (at pH 6.2) containing chloride up to 0.128 M. The exosmosis of chloride from injured cells can be followed quantitatively.—O. L. Inman.

5183. LICHTIN, AARON. **The iron content of lettuce.** Amer. Jour. Pharm. 95: 154-159. Pl. 1. 1923.—The per cent of iron in 5 samples of lettuce is reported as follows: Big Boston, 0.00272; Iceberg, 0.00189; Cos or Romaine, 0.00033; Grand Rapids, 0.00301; May King, 0.00326; the average being 0.00213 per cent. With a salad portion of about 25 gm., one consumes about 0.5 mgm. of iron.—*Anton Hogstad, Jr.*

5184. MCHARGUE, J. S. **Iron and manganese content of certain species of seeds.** Jour. Agric. Res. 23: 395-399. 1923.—The average percentage of iron and manganese found in seeds, each average representing samples of several varieties, is as follows: wheat, iron 0.0039, manganese, 0.0047; oats, Fe 0.0050, Mn 0.0049; garden pea, Fe 0.0096, Mn 0.0012; garden bean, Fe 0.0103, Mn 0.0018; soy-beans, Fe 0.0074, Mn 0.0028; clovers, Fe 0.0156, Mn 0.0039; grasses, Fe 0.0107, Mn 0.0111.—*D. Reddick.*

PHOTOSYNTHESIS

5185. BALY, EDWARD CHARLES CYRIL, ISIDOR MORRIS HEILBRON, and HAROLD JACOB STERN. **Photocatalysis. Part III. The photosynthesis of naturally occurring nitrogen compounds from carbon dioxide and ammonia.** Jour. Chem. Soc. [London] 123: 185-197. Fig. 1-6. 1923.—Aqueous solutions of ammonia saturated with carbon dioxide were exposed to light from a quartz-mercury lamp. After short exposure-periods methylamine and nitric acid in the form of nitrate were found. The results were checked by comparison with the reagents protected from light. This photosynthesis was represented as having taken place "in 2 stages; 1st, the photosynthesis of formaldehyde by the action of light on the carbonic acid, $\text{H}_2\text{CO}_3 = \text{HCOH} + \text{O}_2$ and 2nd, the interaction of the activated formaldehyde and ammonia, $\text{NH}_2 + \text{HCOH} = \text{CH}_3\text{NH}_2 + \text{O}$." The oxygen set free in these 2 reactions oxidized some of the ammonia to nitric acid. After longer periods of exposure pyridine and piperidine were found. These reactions took place under the influence of ultra-violet light and were prevented by the interposition of a plate-glass screen; but they were found to proceed photocatalytically under the influence of visible light when ammoniacal solutions of cupric carbonate saturated with carbon dioxide were used. When stronger solutions of ammonia and formaldehyde were exposed to ultra-violet light for periods of 6-10 days, positive tests for the alkaloid coniine were obtained. Emphasis is laid on the total absence of alpha-amino acids and of all reducing sugars among the products of these reactions; but high excess of formaldehyde resulted in the formation of reducing sugars.—*F. E. Denny.*

5186. BAUDISCH, OSKAR. **On the formation of organic compounds from inorganic by the influence of light.** Science 57: 451-456. 1923.—This work was begun with the observation of the reduction of nitrates to nitrites, which takes place in leaves only in the light. Iron is necessary in the leaves and seems to act as a catalyst. Laboratory experiments proved that iron could so act to reduce nitrites to ammonia in the presence of grape sugar but did not attack nitrates. Ferrous salts were found to reduce nitrates in the presence of oxygen and in direct ratio to the amount of oxygen present. An iron peroxide with magnetic properties is supposed to be formed. While such reductions are taking place, there is formed potassium nitrosyl, $\text{K}(\text{NO})$, which reacts in the light with formaldehyde to make form-hydroxamic acid and formaldoxime. There are indications that bacteria form these compounds by the energy of iron peroxide and thus make nitrates available for protein building. Baly, who has extended the experiments in this field, goes so far as to say that formhydroxamic acid is the first step in the synthesis of nitrogen compounds in plants. The author refuses to make such a statement and is of the opinion that the secret of protein formation by plants will not be solved for a long time.—*C. J. Lyon.*

5187. F., H. B. **The Lourenço Marques Meeting of the South African Association.** Nature 111: 162-164. 1923.—This article includes abstracts of several papers. The presidential address to Section C by D. THORAY dealt with "carbon assimilation." Colorations of weed plants were discussed, their pale green color being attributed to the fact that the intensity of the light renders these colors sufficient.—*O. A. Stevens.*

METABOLISM (GENERAL)

5188. BRIDEL, MARC. Sur la présence simultanée du gentianose et du saccharose dans les espèces du genre *Gentiana*. [Simultaneous presence of gentianose and saccharose in species of the genus *Gentiana*.] Bull. Soc. Chim. Biol. 2: 37-41. 1920.—Bourquelot and Hérissé showed in 1900 that fresh roots of *Gentiana lutea* contain saccharose and the trisaccharide gentianose, and Bridel in 1913 found the same condition in *G. asclepiadea* and *G. punctata*. He now presents the results of a study of *G. cruciata* and *G. purpurea*. Both these species contain saccharose as well as gentianose, both sugars having been prepared in crystalline form. Gentianose preponderates during the period of active growth, but diminishes toward winter with a concurrent increase in saccharose. The author suggests that the seasonal variations in relative amounts of the 2 sugars is due to reversible action of gentiobiase. It is suggested that a similar reversibility of melibiase may be responsible for the presence of raffinose in sugar beet, sugar cane, and *Taxus baccata*.—Joseph S. Caldwell.

5189. BRIDEL, MARC, et R. ARNOLD. Sur l'application aux végétaux du procédé biochimique de recherche du glucose. [The application to plants of the biochemical method of estimating dextrose.] Bull. Soc. Chim. Biol. 3: 297-306. 1921.—Using a tested and refined method for estimating dextrose in mixture with other sugars (first described by Bourquelot and Bridel [see Bot. Absts. 8, Entry 263], which consists in the conversion of 69 per cent of the dextrose present into the readily crystallizable *b*-methylglucoside by the addition of a solution of emulsin in 50 per cent methyl alcohol. After work with the sugars of strawberries and raisins, which demonstrated the applicability of the method to mixtures containing much dextrose and only small amounts of soluble non-sugars, they apply the method to the dry leaves of *Eucalyptus globulus*, which contain little dextrose and large amounts of non-sugars. The method adopted is as follows: the material, dry or fresh, is extracted with boiling alcohol, diluted to predetermined volume with distilled water, and cleared with lead subacetate. After freeing from lead the solution is evaporated under reduced pressure at 50°C. and extracted with boiling acetic ether to remove fatty and resinous matter, alkaloids, and glucosides. The residue is then repeatedly shaken up with boiling 95 per cent alcohol to extract all sugars, the alcoholic extracts are combined, distilled to dryness in presence of calcium carbonate, and the residue dissolved in cold 50 per cent methyl alcohol and filtered. The reducing sugars are determined in an aliquot, and 1 gm. emulsin per 200 cc. is added to the remainder, which last is kept at 20-25°C. with daily shaking. After 10 days a determination of reducing sugars is made, and if any diminution in reducing power has occurred the determination is repeated at intervals until the results become constant. Whether equilibrium has been attained may then be determined by filtering off the emulsin, adding a fresh quantity, and continuing the sugar determinations, by testing the emulsin to determine whether it has lost its activity, or by adding a known amount of dextrose to the solution and ascertaining whether further synthesis occurs. The absolute proof of the presence of dextrose in the original material is the isolation of *b*-methylglucoside in crystalline form from the products of the reaction. This is accomplished by evaporating the solution to dryness and extracting repeatedly with boiling acetic ether, distilling off the ether, dissolving in water, filtering through charcoal, evaporating under reduced pressure, and taking up the residue in equal parts of boiling 95 per cent alcohol and anhydrous acetic ether, from which the methylglucoside crystallizes out on cooling.—Joseph S. Caldwell.

5190. BRIDEL, MARC, et MARIE BRAECKE. Rhinanthine et aucubine. La rhinanthine est de l'aucubine impure. [Rhinanthine and aucubine. Rhinanthine is impure aucubine.] Compt. Rend. Acad. Sci. Paris 175: 640-643. 1922.—It is found that rhinanthine is not a pure chemical compound but is a mixture of aucubine and saccharose in variable proportions. The study is based on seed of *Rhinanthus Crista-Galli*.—C. H. Farr.

5191. BOURQUELOT, EM., et MARC BRIDEL. Application de la méthode biochimique de recherche du glucose à l'étude des produits de l'hydrolyse fermentaire de l'inuline. [Application of the biochemical method for identification of glucose to the study of the products of enzy-

mic hydrolysis of inulin.] Bull. Soc. Chim. Biol 3: 217-225. 1921.—Various workers have reported the presence of saccharose or dextrose in the products of acid hydrolysis of inulin, thus failing to substantiate the earlier work of Bourquelot, who obtained only fructose by hydrolysis of inulin from *Atractylis gummifera* with inulase from *Aspergillus niger*. The authors examined the products of hydrolysis for the presence of dextrose by a method developed by themselves [see Bot. Absts. 6, Entry 2002]. When emulsin is added to mixtures of dextrose and levulose in 70 per cent methyl alcohol and the reaction allowed to proceed to equilibrium, 82.6 per cent of the dextrose is converted into *b*-methylglucoside, irrespective of the relative amounts of dextrose and levulose present. The authors hydrolyzed inulin from *Atractylis* and dahlia with inulase and treated the products of hydrolysis with emulsin in methyl alcohol for 60-80 days. The reducing power of the solution was unaltered and the optical rotation at the end of the treatment was that of pure levulose. That emulsin was not prevented from acting upon any dextrose present by the conditions of the experiments was proved by the fact that 82.6 per cent of added dextrose was converted into methylglucoside. Hence, there is no dextrose in the inulin molecule.—*Joseph S. Caldwell.*

5192. BOURQUELOT, EM., et MARC BRIDEL. *Obtention biochimique de sucre de canne à partir du gentianose.* [Obtaining saccharose from gentianose.] Bull. Soc. Chim. Biol. 2: 160-165. 1920.—The complete hydrolysis of gentianose by enzymes involves 2 stages, invertin splits it to levulose and gentiobiose, the latter being then hydrolyzed by gentiobiase to 2 molecules of dextrose. Saccharose has never been isolated from the products of hydrolysis, hence it has been supposed that gentiobiase could not split gentianose into saccharose and glucose. The authors show that when the enzymes are allowed to act for prolonged periods and the dextrose found is removed by converting it into methylglucoside, saccharose can be isolated from the products of hydrolysis. It is considered to be formed by the action of gentiobiase upon gentianose, but that this action is very much slower than that upon gentiobiase; and it is retarded by the presence of dextrose. This situation is analogous to that seen in the action of invertin on mixtures of saccharose and gentianose, in which gentianose is very slowly split.—*Joseph S. Caldwell.*

5193. DELAUNEY, P. *La loroglossine, glucoside du Loroglossum hircinum Rich.; sa presence dans diverses espèces d'orchidées indigènes.* [Presence of loroglossin in several indigenous orchids.] Bull. Soc. Chim. Biol. 3: 238-246. 1921.—The author examined *Orchis simia* Lam., *O. bifolia* L., *Cephalanthera grandiflora* Babingt., *Ophrys aranifera* Huds., and *O. apifera* Huds., for the presence of loroglossin, the glucoside isolated by Bourquelot and Bridel from *Loroglossum hircinum* Rich. [see Bot. Absts. 3, Entry 2839]. He found in each of these species a glucoside identical in melting point, optical rotation, yield of dextrose on hydrolysis with acid or emulsin, and other characters with loroglossin.—*Joseph S. Caldwell.*

5194. JONESCO, ST. *Recherches sur le rôle des anthocyanes.* [The rôle of the anthocyanins.] Ann. Sci. Nat. Bot. 4: 301-403. 1922.—A review of the literature is given in which special attention is paid to: (1) distribution of anthocyanins, (2) chemical properties, (3) chemical nature, (4) chemical relations of the anthocyanins with the flavones and flavonols, (5) the origin of anthocyanins, (6) chemical processes in the formation of the anthocyanins, (7) the influence of various internal and external factors on the formation of the anthocyanins, and (8) the rôle of the anthocyanins.—In the 1st part of the work, young plants of buckwheat (*Sarrasin argenté*) and Bordeaux wheat were used; in the 2nd, red leaves of *Ampelopsis hederaea* and dahlia flowers. Small, completely etiolated plants were placed in the light, where they very quickly became colored. The amounts of glycosides and flavones in the etiolated plants, also in those exposed to the light, were determined. Finally, determinations of reducing and non-reducing sugars, starch, and cellulose in all the plants experimented with were made.—The amount of glucosides, flavones, and anthocyanins was decreased in the etiolated plants, in proportion to the length of time they were kept in the dark. The reducing and non-reducing sugars and starch were less in the red plants than in the etiolated plants. During the decrease of glucosides, flavones, and anthocyanins a large amount of free phenol compounds were found

to be produced. The same diminution of glucosides, flavones, and anthocyanins in the etiolated dahlia and *Ampelopsis* material was obtained.—The anthocyanins should not be considered as waste products, but as products necessary in the life cycle of the plant.—*Grace E. Howard.*

5195. KENDALL, A. I. Carbohydrate identification by bacterial procedures. Studies in bacterial metabolism, LXVII. Jour. Infect. Diseases 32: 362-368. 1923.—The bacteria studied differed in ability to decompose carbohydrates. On this basis it is suggested that a collection of carefully standardized microbes be utilized as reagents to identify water-soluble carbohydrates.—*R. L. Starkey.*

5196. KENDALL, A. I., and S. YOSHIDA. The estimation of small amounts of carbohydrates by bacterial procedures. Studies in bacterial metabolism, LXVI. Jour. Infect. Diseases 32: 355-361. 1923.—The selective utilization of carbohydrates by bacteria suggests a procedure for determining the presence and abundance of some carbohydrates when they occur mixed with other compounds. The authors were able to determine amounts of levulose as small as 0.001 per cent in peptone medium by measuring the reaction changes effected by *B. coli*. The more sugar initially present in the medium, the greater was the resulting increase in acidity.—*R. L. Starkey.*

5197. KENDALL, A. I., and S. YOSHIDA. The measurement of carbohydrate mixtures by bacterial procedures. Studies in bacterial metabolism, LXVIII. Jour. Infect. Diseases 32: 369-376. 1923.—Cultures of *B. proteus*, *B. mesentericus*, and *B. coli* differed with regard to decomposition of numerous carbohydrates. This characteristic was made use of in determining the presence and amounts of lactose and glucose in prepared solution mixtures of these 2 carbohydrates.—*R. L. Starkey.*

5198. KENDALL, A. I., R. BLY, and R. C. HANER. Carbohydrate configuration and bacterial utilization. Studies in bacterial metabolism, LXIX. Jour. Infect. Diseases 32: 377-383. 1923.—A series of sugar derivatives were prepared from *d*-glucose, mannose, and galactose differing merely in the character of the terminal groups. All of numerous organisms studied decomposed glucose. The other carbohydrates and their derivatives were decomposed by organisms and not by others. The common enol formation was not found to be an absolute prerequisite to fermentation. Most staphylococci were unable to ferment any except the aldose-ketose sugars. It was concluded that the influence of the terminal group in hexose sugars and derivatives on microbial utilization had received some support.—*R. L. Starkey.*

5199. LEPESCHKIN, W. Étude sur les réactions chimiques pendant le gonflement de l'amidon dans l'eau chaud. (Contribution au problème des coefficients de température extrêmement grands.) [Studies on the chemical reactions during the swelling of starch in hot water. (The problem of high temperature coefficients).] Bull. Soc. Bot. Genève 13: 40-65. 1 pl., 1 fig. 1921.—The formation of starch jelly cannot be considered as a particular case of swelling of starch in water. Only the swelling of starch in cold water is a phenomenon purely physical and completely reversible. The swelling of starch in hot water involves 2 processes: (1) a chemical reaction between the polysaccharides of starch and water leading to the formation of hydrates at the expense of the anhydrides; (2) a swelling in water of the products thus formed. The absorption of water by these hydrate compounds is 10 times greater than that observed for starch in cold water, and the absorption of water by starch operates in the same manner in cold and hot water.—All acids except H_2SO_4 accelerate the chemical reaction between the polysaccharides of starch and water. In all cases the acceleration caused by the presence of acids is not proportional to the quantity of H-ions in the liquid. This result confirms the hypothesis that the reaction of special interest in this connection is not one of hydrolysis but rather a chemical union of water with the polysaccharides of starch.—*W. H. Emig.*

5200. ROUGE, E. Sur les flavones et leur rôle dans la cellule végétale. [The rôle of flavones in the plant cell.] Bull. Soc. Bot. Genève 13: 18-19. 1921.—Flavones reduce silver nitrate and give all the reactions indicated by Czapek. After the death of the plant, silver nitrate is not reduced by the chloroplasts or by plasma. The flavones in alkaline solution have a great affinity for oxygen and lose their power to reduce silver nitrate. The flavones are important in the process of assimilation in that they absorb oxygen and transport it away from the cell.—W. H. Emig.

5201. WOLFF, J., et B. GESLIN. Sur quelques propriétés de l'inuline et ses changements d'état physique. [On certain properties of inulin and its changes of physical state.] Bull. Soc. Chim. Biol. 2: 19-23. 1920.—*Schizosaccharomyces Pombe* formed no alcohol during 7 days growth in a solution containing pure inulin; in a solution containing inulin and saccharose the alcohol formed in the same time was equal to all the saccharose and 10 per cent of the inulin present. Impure preparations containing inulides are partially fermentable. The solubility of inulin in water at different temperatures varies with the method of preparation, that obtained by maceration of roots of dahlia in water and evaporating to dryness being much less soluble than that obtained from water extracts by precipitation with alcohol; but such alcohol precipitates again show lowered solubility when dissolved in water and evaporated to dryness. The phenomenon is reversible and due to a change of physical state, possibly to a difference in degree of hydration. Treatment with a water extract of *Aspergillus niger* prior to precipitation with alcohol gives a still greater increase in solubility, especially at lower temperatures. Inulin from dahlia, no matter by what method prepared, is very much less soluble than inulin from *Cichorium Intybus*.—Joseph S. Caldwell.

METABOLISM (NITROGEN RELATIONS)

5202. BLANCHETIERE, A. Action du bacille fluorescent liquéfiant de Flüge sur certains amino-acides en milieu chimiquement défini. [Action of *Bacillus fluorescens liquefaciens* Flüge upon certain amino-acids in a chemically controlled medium.] Bull. Soc. Chim. Biol. 2: 28-36. 1920.—Alanin, leucin, asparagin, phenylalanin, tyrosin, and histidin, singly or in combination, were added in known quantities as sources of nitrogen and carbon for *Bacillus fluorescens liquefaciens*, the medium being otherwise constant in composition. When used singly, histidin, alanin, and asparagin were most readily attacked. When 2 acids, both of which are readily attacked, are employed in mixture, both are used up more rapidly than either would be if used alone, and the presence of one which is readily attacked appears to aid the organism in attacking another which is not used if present alone. The hypothesis is suggested that the unattackable amino acid is deaminized by some of the intermediate metabolic products derived from the attackable acid. Benzoylalanin permitted no growth when used alone. The introduction of the benzoyl radical therefore interferes with the utilization of the acid, as expected from the accepted ideas of the mechanism of bacterial action upon aminoacids. When employed in mixture with alanin there was slight growth without pigment development, but the benzoylalanin was decomposed to some extent, as was shown by recovery of benzoic acid.—Joseph S. Caldwell.

5203. DAVIDSON, JEHL, and J. A. LECLERE. Effect of various inorganic nitrogen compounds applied at different stages of growth on the yield, composition, and quality of wheat. Jour. Agric. Res. 23: 55-68. 1923.—Inorganic nitrates applied in the early stages of growth, uniformly resulted in highest yields but applications made at the time of heading reduced the amount of "yellow-berry" and increased the protein content of the kernels and straw.—Contrary to previous experience, no relation was found between nitrogen content and weight per bushel of grain.—Various chemicals, not nitrogen carriers, such as chlorides of sodium, calcium, potassium, etc., produced no effect on yield or on quality of grain. The application of nitrogen at the time of heading or at the milk stage depressed the phosphoric-acid content of grain and of straw and depressed the ash and silica content of straw.—D. Reddick.

5204. FALK, I. S., and M. F. CAULFIELD. Some influences of hydrogen ion concentration upon antigenic properties of proteins. [Abstract.] *Absts. Bact.* 7: 27. 1923.

5205. HUGOUNENQ, L., et GABRIEL FLORENCE. Recherches sur la synthèse des acides amines aromatiques dans la cellule vivante. Premier mémoire. [The synthesis of aromatic acid amines in the living cell. I.] *Bull. Soc. Chim. Biol.* 2: 13-18. 1920.—*Aspergillus niger* was grown on various modifications of Raulin's solution and tested for the presence of tyrosin and tryptophane by the methods of Adamkiewicz, Herzfeld, and Hopkins and Cole. Hexoses are not necessary for the formation of tyrtophane and tyrosin, since substitution of arabinose and xylose for saccharose did not affect the growth of the fungus or decrease the amounts of tyrosin and tryptophane formed. Normal growth and positive reactions for tyrosin and tryptophane were also obtained when glycocoll, leucin, phenylalanin, tyrosin, or tryptophane were used as sources of nitrogen; no growth was obtained when phenylalanin or the hydrochlorides of lysin or histidin were used. Very poor growth was obtained when 1 gm. per l. of phenylglycin or orthonitrophenylpropionic acid was added to Raulin's liquid. There is therefore a wide range in the raw materials from which the fungus is able to synthesize its proteins; the authors propose to investigate the question whether the cells of higher organisms possess equally great synthetic powers.—*Joseph S. Caldwell.*

5206. HUGOUNENQ, L., et GABRIEL FLORENCE. Recherches sur la synthèse des acides amines aromatiques dans la cellule vivante. Deuxième mémoire. Étude de l'aspergilline. [The synthesis of aromatic acid amines in the living cell. II. Aspergilline.] *Bull. Soc. Chim. Biol.* 2: 133-136. 1920.—The authors isolated the black pigment of *Aspergillus niger*, which they name aspergilline, by treating the spores with 10 per cent NaOH, neutralizing with H₂SO₄ to precipitate, washing with water, dissolving in NH₄OH, precipitating with acetic acid, washing, and drying, thus obtaining a non-crystalline powder insoluble in water or acid but soluble in alkalies. It contains Fe, S, Zn, and Ca, and the elementary analysis suggests to the authors a likeness to hematogen of eggs. They regard both substances as greatly condensed substance containing all the mineral elements necessary for the development of the new organism. Distillation by Nencki's method set free ammonia, indol, and a compound having the odor of amylamine, while the residue contained small amounts of fatty acids.—*Joseph S. Caldwell.*

5207. MESTREZAT, W. et MARTHE PAUL JANET. L'azote titrable par la méthode de Kjeldahl. [Estimation of nitrogen by the Kjeldahl method.] *Bull. Soc. Chim. Biol.* 3: 105-130. 1921.—This is a comprehensive résumé of the literature, discussing various modifications of the original method. Nitrogenous compounds are grouped into 5 classes with respect to the ease with which the nitrogen may be measured by the Kjeldahl method. (1) Very readily determined: aliphatic amines, certain aromatic amines, imines, amides, urcides, the pyrrol nucleus, the pyrimidine nucleus, purine and its derivatives. (2) Possible but difficult to determine, requiring prolonged heating, etc.: guanidine derivatives, indol and skatol nuclei, acridine, the quinoline nucleus, the piperazine nucleus, morphine, brucine. (3) Difficult and giving only doubtful results: certain aromatic amines, quaternary ammonium compounds, azo-, azoxy-, and diazo-derivatives (doubtfully), the tropic nucleus, tyrosin. (4) Direct measurement impossible, but may be made after reduction: nitrates, nitrites, nitro and nitroso derivatives, nitriles, cyanogen derivatives, hydrazines, hydrazones, osazones, azo-, azoxy-, and diazo derivatives. (5) Compounds the nitrogen of which is lost in wet-way determinations: Pyridin and pyrazol and their derivatives. A bibliography of 50 selected titles is appended.—[See also following abstract.].—*Joseph S. Caldwell.*

5208. MESTREZAT, W., et MARTHE PAUL JANET. Présence dans l'urine d'une reste azoté que ne dose pas la méthode de Kjeldahl. Étude comparée des resultats fournis dans quelques cas par la technique de Kjeldahl-Foerster et la méthode de Dumas. [Presence in urine of a nitrogenous residue not determined by the Kjeldahl method. Comparative results obtained by the Kjeldahl-Foerster and the Dumas methods.] *Bull. Soc. Chim. Biol.* 3: 88-94. 1921.—The yields by the Dumas method were in all cases 1-9 per cent higher than those by the

Kjeldahl-Forster method. The reasons for the discrepancy are discussed in detail in another paper [see preceding abstract].—*Joseph S. Caldwell.*

5209. THOMAS, P. Le dosage colorométrique de la tyrosine et l'indice phénolique de protéiques. [Colorimetric estimation of tyrosin and the phenolic index of proteins.] Bull. Soc. Chim. Biol. 3: 197-216. 1921.—The author's earlier work on colorimetric methods of estimating tryptophane [see following abstract] led him to examine the colorimetric methods of estimating tyrosin proposed by Folin and Denis, Denigès, and Morner, and by the use of Milton's reagent. He finds that the results obtained by the Folin and Denis method are affected by the time allowed for the reaction, the presence of tryptophane, various reducing substances, indol and its derivatives, and dioxyphenylalanin, with the result that he pronounces it wholly untrustworthy. The Denigès-Morner reaction is not sufficiently delicate and the color obtained in a mixture of products of protein hydrolysis is difficult to measure colorimetrically, hence work with it was abandoned. The author then endeavored to employ Millon's reagent in such manner as to make the reaction a quantitative test for tyrosin, finding that tryptophane, oxytryptophane, and dioxyphenylalanin gave interfering colorations. Tryptophane may be removed from the products of protein hydrolysis by precipitation with a mercury salt, but such treatment would not remove oxytryptophane or dioxyphenylalanin if present. Nillon's reagent can therefore be employed as a colorimetric method for determining the total content of phenol compounds, or "phenolic index," of a protein, in terms of tyrosin. A standard method of employing it is described and results of a number of determinations upon 9 proteins are given in the form of a table, in which the content of tyrosin as determined by Folin and Denis and by the author using their method is compared with the author's phenolic index and with the tyrosin content found by workers who have made quantitative analyses. Thomas invariably obtains considerably higher results by the use of the Folin-Denis method than do these authors themselves. The phenolic index determinations run roughly parallel but are much lower in such proteins as are rich in tryptophane, and all are very much higher than the amounts obtained by quantitative analyses.—*Joseph S. Caldwell.*

5210. THOMAS, P. Sur le dosage de l'ammoniaque dans les cultures en présence d'urée. [The determination of ammonia in cultures in the presence of urea.] Bull. Soc. Chim. Biol. 7: 171-175. 1919.—A method for determining small quantities of ammonia in the presence of large amounts of the various nitrogenous products present in a yeast culture is described. Phosphoric acid is eliminated from the solution by adding hydrochloric acid and neutral lead acetate until no further precipitation occurs, after which powdered lead carbonate is added and the solution allowed to stand 15-18 hours. The liquid is then filtered and the filter washed with cold water. Magnesia is added and the distillation is conducted under reduced pressure in a modified Schloesing-Aubin apparatus at 35-40°C. Air enters through a trapflask containing H₂SO₄ and the NH₃ is drawn through a condenser and received into H₂SO₄ and determined by titration. The author claims advantages over the similar method of Nencki and Zaleski in that the apparatus employed is simpler and everywhere obtainable.—*Joseph S. Caldwell.*

METABOLISM (ENZYMES, FERMENTATION)

5211. AMBARD, L. Fixation de l'amylase par l'amidon cru et l'empois d'amidon. [Fixation of amylase by raw starch and starch paste.] Compt. Rend. Soc. Biol. 83: 1458-1460. 1920.—It has been established by Sorensen, Michaelis and Rona, and others that amylolytic action of amylase is greatest when the medium has a pH of 6.6. It is easy to obtain this reaction with extracts high in amylase content, as saliva or pancreatic juice, but it is difficult to adjust the reaction with such materials as urine or blood, which are low in amylase. The authors find that it is possible to adsorb quantitatively the amylase present in such dilute solutions upon raw commercial rice starch and to remove foreign substances by washing without loss of the enzyme. When added to a starch paste adjusted to pH 6.65, the enzyme is quantitatively transferred to combination with the paste, as is shown by the fact that the enzymic activity is 96-98 per cent of that of check solutions.—Adsorption of amylase by raw starch is apparently specific; it has no power to adsorb invertase. Some experiments with invertase adsorbed upon

animal charcoal show that, contrary to expectation, the charcoal retains invertase quantitatively when washed with 0.1 per cent sugar solution but gives it up almost wholly when the wash water contains no sugar. The phenomenon is much more complex than has heretofore been realized, as the presence of small quantities of sugar is necessary for the fixation of invertase upon carbon.—*Joseph S. Caldwell.*

5212. AMBARD, L. Fixation de l'amylase sur l'amidon cru et l'empois d'amidon. [Fixation of amylase by raw starch and starch paste.] *Compt. Rend. Soc. Biol.* 84: 230-232. 1921.—Continuing an earlier note of the same title [see preceding abstract] the author reports further studies of the conditions for the adsorption or fixation of amylase upon raw starch. He substitutes glycogen for starch paste in digestion experiments for the reason that the latter is partially precipitated from saline solution by centrifuging, hence is difficult to separate from the raw starch. Fixation of the enzyme upon raw starch is as complete in an electrolyte-free medium as in saline solution, but when amylase adsorbed upon raw starch is added to a solution of salt-free glycogen not more than 4 per cent of the amylase is set free. If NaCl be added the amylase is quantitatively released. These facts indicate that amylase is a colloid and that it follows the general laws of colloids in forming adsorption compounds, as is also suggested by the readiness with which it is precipitated from solution under certain conditions. The proportions of amylase released from the enzyme-starch complex by identical quantities of glycogen are 98, 90, and 74 per cent when the concentrations of glycogen are 1, 0.1, and 0.01 per cent respectively, hence follow the general laws of adsorption. This fact may furnish an explanation of the observation that when the initial concentration of starch is 1 per cent or more the amount of hydrolysis per unit of time is constant, while it rapidly decreases if the initial concentration is less than 0.1 per cent. If the formation of a combination between enzyme and substrate is a preliminary step in the reaction, the proportion of combined and active enzyme must fall off as the initial concentration of the substance is decreased.—*Joseph S. Caldwell.*

5213. AMBARD, L. Sur l'amylase. Son dosage. Mechanisme de la digestion amylolytique. [Amylase, its estimation; mechanism of digestion by amylase.] *Bull. Soc. Chim. Biol.* 3: 51-65. 1921.—Continuing previous studies [see 2 preceding abstracts] the author gives details of the technique for absorbing amylase upon raw starch, shows that the absorption is specific and quantitative, and that reducing substances are not taken up on the starch. The paper is principally concerned with the conditions for release or "defixation" of the enzyme from combination with starch. Preparations repeatedly washed with 2 per cent solutions of levulose, saccharose, glycerol, maltose, inulin, gum arabic, or mastic in 0.3 per cent saline solution showed no defixation, but preparations washed with ferric hydroxide and aluminum hydroxide showed reduction to 63.5 and 70.4 per cent respectively of normal activity. The author assumes that Fe and Al enter into combination with the enzyme-starch complex, thus "immobilizing" the enzyme. Glycogen is to be preferred to starch paste for defixation because of its greater stability; the presence of a neutral salt, such as NaCl, is absolutely necessary for defixation. The reaction of the medium is important and should be pH 6.6. At pH 5.0 and 8.04 the activity of the enzyme is only 60 per cent of the normal, although the destruction of the enzyme at these points is only about 2.5 per cent. The author finds no evidence that the fixation of amylose upon glycogen is retarded by the accumulation of maltose, since the presence of maltose in the solution with glycogen does not affect the defixation of amylose from raw starch. The rate of hydrolysis is determined by the number of enzyme substrate groups in combination, by the temperature and reaction of the medium, and by the accumulation of products of the reaction.—*Joseph S. Caldwell.*

5214. AMBARD, L., E. PELBOIS, et M. BRICKA. Similitude de l'hydrolyse du sucre par les acides et de l'hydrolyse de l'amidon par l'amylase.—Etude de certaines réactions monomoléculaires. [Similarity of the hydrolysis of saccharose by acids and the hydrolysis of starch by amylase; a study of the mechanism of certain monomolecular reactions.] *Bull. Soc. Chim. Biol.* 2: 42-63. 1 fig. 1920.—The authors advance the thesis that the rôle played by neutral salts in the hydrolysis of starch by amylase is qualitatively and quantitatively identical with

that which they play in the hydrolysis of saccharose by acids, and that the so-called "activation" of the enzyme by salts is in reality an effect exerted upon the substrate. The argument rests upon experimental data showing that the amount of sugar produced per unit of time when starch paste containing known amounts of NaCl is acted upon by salivary amylase which has been dialyzed until free of salts, is directly proportional to the amount of amylase employed, but is not materially affected by a considerable variation in the amount of NaCl present. The mechanism of the action of neutral salts upon the substrate is not explained, and the widely accepted hypothesis that they accelerate enzymic activity through increasing the colloidal dispersion of the enzyme is not mentioned.—*Joseph S. Caldwell.*

5215. BRIDEL, M., et R. ARNOLD. Sur l'emploi de divers agents de précipitation dans la préparation de l'émulsine des amandes. [The use of various precipitating agents in preparing emulsin from almonds.] Bull. Soc. Chim. Biol. 2: 216-222. 1920.—Three preparations made from sweet almonds are compared as regards enzymic activity. Preparations were made (1) by precipitating an aqueous extract with 2 volumes 95 per cent ethyl alcohol, which was allowed to act 48 hours; (2) by using 2 volumes methyl alcohol, allowed to act 31 hours; (3) by using 2 volumes of acetone, allowed to act 28 hours. When washed with ether and dried, the comparative yields for the 3 were as 16:15:21. The 3 preparations were tested as to both hydrolytic and synthetic activity of *b*-glucosidase, *b*-galactosidase, lactase, gentiobiase, cellobiase, and invertin. The hydrolytic activity of *b*-glucosidase, tested on amygdalin, salicin, *b*-benzylglucoside, and *b*-methylglucoside, was identical for the 3 preparations, as was the synthesis of *b*-methylglucoside from glucose in methyl alcohol. Activity of the galactosidase was tested upon *b*-ethylgalactoside, and was greatest in the ethyl alcohol preparation, least in the acetone preparation; the 3 preparations held the same order as regards synthetic activity. There were only insignificant differences in the activity of lactase, gentiobiase, and cellobiase in the 3 preparations, but the invertin of the methyl alcohol preparation was most rapid in action. Emulsin may be prepared in any of these ways but prolonged contact with the precipitating agent should be avoided.—*Joseph S. Caldwell.*

5216. COLIN, H. Action de la sucrase sur les satellites de l'inuline. [Action of sucrase on the sugars accompanying inuline.] Bull. Soc. Chim. Biol. 2: 157-159. 1920.—The expressed sap of common varieties of *Helianthus tuberosus* becomes strongly dextrorotatory during winter despite the presence of various laevorotatory polyoses which accompany inulin. Hydrolysis of saccharose alone could not account for the change. Addition of sucrase to the expressed sap brings about hydrolysis occurring in 2 stages, in which the changes in optical rotation and in reducing power do not run parallel, indicating that more than 1 sugar is being acted upon. Pseudo-inulin, inulinin and helianthenin, which accompany inulin, are readily prepared by reason of their differing solubility in alcohol. In the pure state they are not attacked by sucrase. Synanthrin, which is difficult to separate from saccharose, is hydrolyzed concurrently with saccharose; whether this is due to the action of sucrase or to that of a specific synanthrin-splitting enzyme which is associated with sucrase is to be further investigated.—*Joseph S. Caldwell.*

5217. COLIN, H. Quelques corollaires des lois de l'hydrolyse diastatique. [Certain corollaries of the laws of enzymic hydrolysis.] Bull. Soc. Chim. Biol. 3: 263-272. 1921.—When a quantity of saccharose is acted upon by invertin under constant conditions, the amount of inversion per unit of time is a constant until a point is reached at which the alteration in ratio of concentration between sugar and enzyme begins to affect the rate. Whether the curve is a true logarithmic one depends upon the initial ratio between enzyme and substrate. The mathematical laws applying to the process hold for all enzymic hydrolyses in which a single reaction occurs under definite conditions, but not for such complex reactions as the conversion of starch by diastase. The author shows how the laws of hydrolysis may be applied to the determination of the degree of purity of various sugars, as raffinose, synanthrin, and gentianose, to the measurement of the quantity of enzyme, and to the determination of molecular weights of sugars.—*Joseph S. Caldwell.*

5218. EMOTO, YOSHIKADZU. Ueber die Enzyme einiger Saprolegnien. [Enzymes of some Saprolegnias.] Bot. Mag. Tokyo 37: (13)-(29). Pl. 1. 1923. (In Japanese.)—In *Saprolegnia Tokugawana* n. sp., which is described in detail, positive reactions were obtained for the following intra-cellular enzymes: amylase, inulinase, pectinase, cellulase, raffinase, invertase, lactase, maltase, emulsin, salicase, and proteolytic enzymes (acid, neutral, alkaline). Glycolase (Glykolyse), lipase, urease, tyrosinase, oxydase, peroxydase, and catalase were not found. In a species of *Achlya* lacking oogonia the results were identical except that glycolase (Glykolyse) was present.—Of intra-cellular enzymes in the *Saprolegnia*, amylase, inulinase, raffinase, invertase, lactase, maltase, emulsin, salicase, glycolase (Glykolyse), proteolytic enzymes (acid, neutral, alkaline), peroxydase, and catalase were present and pectinase, cellulase, lipase, urease, tyrosinase, and oxydase absent. In the *Achlya*, amylase, inulinase, cellulase, invertase, lactase, maltase, emulsin, salicase, proteolytic enzymes (acid, neutral, alkaline), peroxydase, and catalase were present and pectinase, glycolase (Glykolyse), lipase, urease, tyrosinase, and oxydase absent.—From Author's German abstract.

5219. HARVEY, ELLERY H. Efficiency of some common anti-ferments. Amer. Jour. Pharm. 94: 797-801. 1922; 95: 105-108. 1923.—The author records the effect of some 18 anti-ferments, including mercuric chloride, potassium cyanide, sodium hypochlorite, ultra-violet rays, sodium arsenate, hydrogen peroxide, methyl salicylate, furfural, formaldehyde, copper sulphate, etc., on invertase of yeast in sucrose solutions. The method for measuring the retarding action is given. The author suggests that the ultra-violet radiation, used as a bactericide, might further be employed as an anti-ferment, since no toxic residue is left in the treated material. In most cases the action of the anti-ferment was one of gradual retardation rather than an immediate cessation of activity. Many commonly used materials were noted to have a low percentage of activity.—Part II. The action of an additional list of anti-ferments on yeast is reported, which includes several volatile oils from spices, nitro-benzol, oxalic acid, saccharin, sodium fluoride, etc. The use of volatile oils, within the limits set by the taste, is an aid in the preservation of such food products as catsup, tomato sauce, etc. Saccharin exerts but a mild anti-ferment action. The yeast activity was found to be but slightly inhibited by dilute salt solutions. Dilute mineral acid hydrolysis of sucrose solutions produced a curve having the characteristics of enzyme-inverted sugar solutions.—Anton Hogstad, Jr.

5220. JOFFE, JACOB S. Homogeneous catalysts in the oxidation of sulfur by *Thiobacillus thiooxidans*. [Abstract.] Absts. Bact. 7: 8. 1923.—The activities of the organism, resulting in the production of sulphuric acid as high as 2 N, are increased by the presence of several catalysts, particularly by nickel, uranium, caesium, and zinc. The presence of 10 ppm. of salts of these metals in the medium with an excess of sulphur resulted in an increase of from 20 to 40 per cent oxidation of sulphur in 30 days.—D. Reddick.

5221. MELDOLESI, GINO. Die Wirkung von Druck auf die Geschwindigkeit der Fermenthydrolysen durch Pepsin, Trypsin und Diastase. [The effect of pressure on the rate of hydrolysis by pepsin, trypsin, and diastase.] Biochem. Zeitschr. 115: 85-95. 1921.—The writer finds that the action of pepsin and trypsin upon blood albumin is influenced by pressure. The pressure over 1 atmosphere was produced by CO₂ or N₂. The reaction was most rapid at a pressure of 5 atmospheres, less at 10 atmospheres, but more than at 1 atmosphere pressure. The difference in rate was most noticeable during the first 2 hours of the experiments. The hydrolysis of arrow-root starch by diastase was also studied; pressure influenced the reaction in the same way as it affected the reaction of pepsin and trypsin. The reactions are illustrated by graphs.—F. G. Gustafson.

5222. MICHAELIS, L. Weitere Beiträge zur Theorie der Invertasewirkung. [Further contribution to the theory of invertase action.] Biochem. Zeitschr. 115: 269-281. 1921.—In colloidal solutions the reaction is usually proportional to the surface and not to the concentration of the dissolved substance. This is not the case with invertase, for here the active

mass of the enzyme, whether free or adsorbed on ferric hydroxide or carbon, is always proportional to the concentration. This fact entitles one to apply the mass law to the inversion of cane sugar. The effectiveness of the invertase adsorbed by the ferric hydroxide does not depend upon the ability of the cane sugar to dissolve it from the hydroxide, because the adsorbed invertase hydrolyses the sugar before it is dissolved from the hydroxide. Other disaccharides are able to dissolve the invertase from the ferric hydroxide without themselves being acted upon by the enzyme.—*F. G. Gustafson.*

5223. NEUBERG, CARL, und JULIUS HIRSCH. Über ein Kohlenstoffketten knüpfendes Ferment (Carboligase). [Carboligase, a carbon chain-synthesizing enzyme.] *Biochem. Zeitschr.* 115: 282–310. 1921.—The experimental work is divided into 3 parts. In the 1st the reaction between cane sugar and benzaldehyde in the presence of yeast is discussed. The 2nd part deals with the reactions characteristic of the substance formed from sugar and benzaldehyde. The empirical formula is given as $C_9H_{10}O_2$ with the probable structural formula $C_6H_5 \cdot CO \cdot CHOH \cdot CH_3$. The 3rd part deals with the enzyme nature of the substance found in yeast which brings about the reaction between benzaldehyde and acetaldehyde, derived freshly from the destruction of sugar. Carboligase, as the enzyme is called, facilitates the construction of carbohydrates, while carboxylase aids in their destruction.—*F. G. Gustafson.*

5224. RUEHLE, G. L. A. The enzymic content of bacterial spores. [Abstract.] *Absts. Bact.* 7: 7. 1923.

5225. SOPPELAND, LULU C., and MAX LEVINE. On some factors influencing proteolysis in dairy wastes. [Abstract.] *Absts. Bact.* 7: 19. 1923.—An adequate supply of air and a neutral or slightly alkaline reaction are favorable for proteolysis.—*D. Reddick.*

METABOLISM (RESPIRATION, AERATION)

5226. MAQUENNE, L., et E. DEMOUSSY. Observations sur la résistance des végétaux à l'asphyxie. [Observations on the resistance of plants to asphyxiation.] *Bull. Soc. Chim. Biol.* 3: 273–278. 1921.—Failure of germination in seeds submerged in water is shown to be due to the low O_2 content of the water; when provision was made for aerating water constantly circulated through a tube containing the seeds, normal germination and development of the young plants occurred. Older plants when completely immersed die very quickly because of the slow diffusion of air through water.—The darkening of many leaves on dying is due to oxidation, and does not occur in the absence of air. In the leaves of *Aucuba* darkening on dying occurs even in vacuo and is due to the splitting of the glucoside aucubin by emulsin. It therefore serves as a check upon the condition of the cells. Floated on water, the leaves remain green for 2 months, when submerged 4–5 mm. in water they brown in 3–4 days by reason of lack of O_2 . In leaves which discolor as a result of oxidation no change of color occurs while submerged, but they very rapidly become brown when again brought into the air. When leaves of this type are spread flat against a surface beneath water which is aerated, those which have the lower surface toward the water discolor very quickly, those with the upper surface very much more slowly, showing that O_2 enters at a rate directly proportional to the number of stomata. In strong sunshine submerged leaves live for very long periods, since the light decomposes the CO_2 given off in respiration thus constantly renewing the O_2 supply. Sealed into a dry tube exhausted of air, leaves of *Aucuba* placed in the dark remain living 2 or 3 days by means of intracellular respiration. Placed in light they remain alive more than 2 months by reason of the establishment of a cycle in which the respired CO_2 is decomposed to yield O_2 ; this the colorless leaves found on weak branches are wholly unable to do.—*Jacseph S. Caldwell.*

5227. RAY, GEORGE B. Comparative studies on respiration. XXIV. The effects of chloroform on the respiration of dead and of living tissue. *Jour. Gen. Physiol.* 5: 469–475. *Fig. 1–4.* 1923.—By use of H_2O_2 and $Fe_2(SO_4)_3$, powdered dead *Ulva* and chloroform gave results comparable to those obtained by action of chloroform upon living tissue. The effect

of chloroform upon a mixture of H_2O_2 and $\text{Fe}_2(\text{SO}_4)_3$ depends upon the concentration of the iron. If the concentration is low there is an increase in the production of CO_2 , followed by a decrease. If the concentration is high the rate appears to decrease from the start.—O. L. Inman.

5228. ROUGE, E. *Le réveil de la terre (réponse aux deux récentes communications de M. Auguste Lumière, Lyon)*. [The awakening of the earth (a reply to 2 recent communications of August Lumière).] *Bull. Soc. Bot. Genève* 13: 13-16. 1921.—August Lumière says that the cause of seasonal rhythm and the awakening of the earth are independent of variations in temperature. Experiments with germinating seeds indicate that Lumière's theory of the rôle of atmospheric O_2 and chemical changes in the soil does not explain the cause for renewed growth in the spring.—W. H. Emig.

5229. WAKSMAN, SELMAN A., and ROBERT L. STARKEY. *On the growth and respiration of sulphur-oxidizing bacteria*. *Jour. Gen. Physiol.* 5: 285-310. *Fig. 1-6*. 1923.—*Sulfomonas thiooxidans* is shown to be a sulphur-oxidizing bacterium. It oxidizes elementary sulphur to sulphuric acid and sodium thiosulphate to sulphate. The organism derives its carbon from the CO_2 of the air. Sulphates do not exert any injurious effect upon sulphur oxidation by *Sulfomonas thiooxidans* but nitrates exert a distinctly injurious action both on the growth and respiration of the organism. Dextrose below 5 per cent shows no deleterious effects. The oxidation of sulfur takes place normally at 0.25 molar acid, but that concentration may be greatly increased without bad effect. Using a respirometer like that of Meyerhof the respiration of growing cultures was studied.—O. L. Inman.

5230. WAKSMAN, SELMAN A., and ROBERT L. STARKEY. *Energy transformations by micro-organisms*. [Abstract.] *Absts. Bact.* 7: 7. 1923.—*Thiobacillus thiooxidans* obtains its energy from the oxidation of elementary sulphur, thiosulphate, and sulphides, and its carbon from CO_2 of the air. For every part of carbon assimilated about 32 parts of sulphur are oxidized; 6.7 per cent of energy made available in the oxidation is used for the assimilation of carbon.—D. Reddick.

ORGANISM AS A WHOLE

5231. EDWARDS, S. F. *A note on the longevity of some cultures of B. radicola*. [Abstract.] *Absts. Bact.* 7: 9. 1923.—*Bacillus radicola* from red clover [*Trifolium pratense*] was kept alive and virulent in a sealed test-tube for 16 years. Similar cultures from white clover [*T. repens*] and from alfalfa [*Medicago sativa*] were kept for 10 years.—D. Reddick.

5232. HASTINGS, E. G. *A comparison between the resistance to an unfavorable environment of organisms that have grown in native habitats and the same kind grown in artificial culture*. [Abstract.] *Absts. Bact.* 7: 6. 1923.

5233. LENDNER, A. *Culture expérimentale de Spinellus macrocarpus*. [Experimental culture of *Spinellus macrocarpus*.] *Bull. Soc. Bot. Genève* 13: 8-9. 1921.—*Spinellus macrocarpus*, a parasitic fungus on *Mycena epiptorigia*, was grown on an infusion of *Tricholoma terreum*.—W. H. Emig.

5234. SHERMAN, J. M., and W. R. ALBUS. *The function of "lag" in bacterial cultures*. [Abstract.] *Absts. Bact.* 7: 7. 1923.—"Instead of viewing the latent period as an expression of injury received by the organism in its previous environment, we feel that a more satisfactory explanation would be to consider it as a biological rejuvenescence."—From Author's Abstract.

5235. YOUNG, C. C., and M. GREENFIELD. *Observations on the viability of the Bacterium coli group under natural and artificial conditions*. *Amer. Jour. Public Health* 13: 270-273. 1923.

5236. TROTTER, H. **Height growth of seedlings.** *Indian Forester* 48: 640-644. *Pl.* 19. 1922.—Monthly height determinations of selected seedlings 1 year old were made at Dehra Dun. Tables and a chart are given showing the growth in inches by months for *Shorea robusta*, *Cedrela toona*, *Acacia catechu*, *Dalbergia sissoo*, *Bombax malabricum*, and *Terminalia tomentosa*. The growth curves for some of the species follow closely the form of the precipitation curve.—E. N. Munns.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

5237. NEWCOMBE, F. C. **Response of sensitive stigmas to unusual stimuli.** *Rept. Michigan Acad. Sci.* 22: 145-146. 1920.—When wheat flour is placed upon the stigmas and the latter are touched gently, they close in the species studied and remain closed in *Tecoma radicans* L. Juss. and *Catalpa speciosa* Warder, but reopen in *Mimulus glabratus* HBK. var. *Jamesii* (T. & G.) Gray. If pollen is used in the place of the wheat flour the stigmas remain closed in all 3 and if emery powder is used the stigmas of all 3 reopen in 10-30 minutes. Immersion of the pistil with open stigma lobes in water does not cause closing. A drop of water placed on the stigmas in the act of closing causes a reversal of movement. Immersion in alcohol or hot water causes very prompt closing. A weak electric current causes prompt closing with subsequent reopening. Cutting through the style within 2 mm. of the stigmas causes no closing, but pinching or pressing the style, even 10 mm. away from the stigmas, causes the latter to close. Probably the closing is due to extrusion of water from a turgid tissue.—Ernst A. Bessey.

5238. SNOW, R. **The conduction of excitation in Mimosa.** *Nature* 111: 237. 1923.—The writer reviews briefly the work of Ricca and others which seems to show that conduction is by dissolved substances in the water stream. Dutrochet used *Mimosa Spegazzinii* in which it is possible to remove easily the tissues outside the cambium. In that species, basipetal conduction takes place with difficulty, but in *M. pudica* it takes place easily and rapidly. Such conduction may not be dependent upon the water current only, and further work is desirable.—O. A. Stevens.

GERMINATION, RENEWAL OF ACTIVITY

5239. BURKE, GEORGINA S. **Dormancy in spores of Clostridium botulinum.** [Abstract.] *Absts. Bact.* 7: 11. 1923.—Spores on nutrient agar remained dormant for 92 days and in broth for 144 days.—D. Reddick.

5240. PETRY, E. J. **Germination and growth of Ceanothus americanus as affected by heated soils.** *Rept. Michigan Acad. Sci.* 22: 135-143. *Pl.* 13-14. 1920.—For seeds treated in various ways, viz., scarified, acid-etched, or untreated, and using 3 types of soils sterilized at various steam pressures, it was determined that for certain types of soil, toxic substances are liberated by the heating which reduce or even prevent germination, while other soils are not thus affected. The effect of such soils upon the further growth of the seedlings was also followed.—Ernst A. Bessey.

TEMPERATURE RELATIONS

5241. ESTY, J. RUSSELL. **The heat resistance of B. botulinus spores.** [Abstract.] *Absts. Bact.* 7: 6. 1923.—In all, 112 strains of *Bacillus botulinus* were tested. Heat resistance at 105°C. varies from 3 to 75 minutes. Maximum resistance is 330 minutes at 100, 33 at 110, 11 at 115, and 4 at 120°C.—D. Reddick.

5242. MCALPINE, JAMES G. **The influence of autoclave sterilization on carbohydrates in culture media.** [Abstract.] *Absts. Bact.* 7: 5. 1923.—Sucrose is relatively stable when heated in a neutral buffered medium for 15 minutes at an extra pressure of 15 pounds while maltose and lactose undergo partial hydrolysis.—D. Reddick.

RADIANT ENERGY RELATIONS

5243. COONS, G. H., and EZRA LEVIN. The relation of light to pycnidium formation in the Sphaeropsidales. Rept. Michigan Acad. Sci. 22: 209-213. *Fig. 1.* 1920.—Thirty-two species of Sphaeropsidales, isolated mainly by the junior author, and grown from single spores, were cultivated in diffuse daylight, in the dark, and under electric light, under similar conditions of ventilation and temperature, each fungus being grown on 3 media,—cornmeal agar, oatmeal agar, and prune-juice agar. Sixteen of the species produced pycnidia only in the illuminated cultures, 16 produced pycnidia in both light and darkness, while 2 of those in the diffuse daylight actually reduced the number of pycnidia. The results showed no close relation as between light influence and the generic affinities of the species.—*Ernst A. Bessey.*

5244. REINLE, HANS. Über die Wirkung der Becquerel- und Röntgenstrahlen sowie des ultravioletten Lichtes auf die Peroxydase und Methylenblau-Formalin-Reduktase-Reaktion der Kuhmilch. [On the effects of Becquerel and Roentgen rays and of ultraviolet light on the peroxidase and methyleneblue-formalin-reductase reaction of cow's milk.] Biochem. Zeitschr. 115: 1-21. 1921.—The writer found that the Becquerel and the Roentgen rays had no effect upon the activity of the peroxidase and the aldehyde reductase of milk. The Becquerel rays were obtained from RaCl_2 . It was found that the 1st hour's exposure of the milk to ultraviolet light had no effect upon either the peroxidase or reductase activity, but further exposure was somewhat harmful.—*F. G. Gustafson.*

5245. SEMMENS, ELIZABETH SIDNEY. Effect of moonlight on the germination of seeds. Nature 111: 49-50. 1923.—Increased velocity of germination has been found, and it is suggested that this effect is upon the diastase and is due to the plane-polarization of the moon light at certain periods. Experiments on various starches in polarized light seem to confirm this explanation.—*O. A. Stevens.*

TOXIC AGENTS

5246. BERTRAND, GABRIEL, et M. MOKRAGNATZ. Sur la présence du cobalt et du nickel chez les végétaux. [The presence of cobalt and nickel in plants.] Compt. Rend. Acad. Sci. Paris 175: 458-460. 1922.—Results of these studies are positive for nickel in all plants studied, and positive for cobalt only in carrot and oats. The plants studied are: roots of carrot, bulbs of onion, tubers of potato, leaves of spinach, leaves of lettuce, leafy shoot of cress, fruit of tomato, pericarp of apricot, seed and shells of beans, seed of lentils, seed of buckwheat, seed and bran of wheat, corn, rice, and the chanterelle fungus.—*C. H. Farr.*

5247. EATON, SYLVIA M., and HARPER F. ZOLLER. Some studies on the bactericidal action of sodium hypochlorite in cow's milk. [Abstract.] Absts. Bact. 7: 21-22. 1923.

5248. FALTA, W., und M. RICHTER-QUITTNER. Über die sogenannte oligodynamische Wirkung von Schwermetallen und Schwermetallsalzen. [Investigation on the so-called oligodynamic action of heavy metals and their salts.] Biochem. Zeitschr. 115: 39-41. 1921.—The heavy metals Cu, Hg, Ag, Pb, Sn, Zn, Al, Fe, Mg, and Pt were investigated, their effectiveness decreasing in the order named. The metals were placed in water in glass tubes for 8 days, after which the water was poured out and the tubes rinsed several times with distilled water and then filled with the solution to be employed. The authors studied the effect of these metals on: (1) easily oxidizable substances, such as guaiac, benzidine, resorcin, and potassium permanganate; (2) color substances like methylene blue, indigo blue, and malachite green leucobase; (3) coagulation of protein solutions; and (4) hydrolysis of starch to sugar. From these studies they concluded that the reactions are of the nature of catalysis. The ions are the active constituents; these are adsorbed by the glass tube and later pass into the solution giving a very dilute solution of the metal in question.—*F. G. Gustafson.*

5249. LEVINE, MAX and JOHN C. WELDIN. **Germicidal efficiency of a boric acid canning compound.** [Abstract.] Absts. Bact. 7: 5-6. 1923.—The compound consists of about 95 per cent boric acid and 5 per cent sodium chloride. It has little germicidal value at the concentration recommended.—D. Reddick.

5250. WILSON, H. F., and W. A. HADFIELD. **The effect of sodium hypochlorite upon the spores of American foul brood.** Science 57: 334. 1923.—Experiments show that the spores of *Bacillus larvae* are destroyed by special solutions of sodium hypochlorite and such solutions can be used to disinfect hives and combs. The bees are not poisoned by eating the chemical.—C. J. Lyon.

5251. YOUNG, H. C., and C. W. BENNETT. **Studies in parasitism. I. Toxic substances produced by fungi.** Rept. Michigan Acad. Sci. 22: 205-208. 1920.—The paper presents a study of the toxic principle produced by a virulent strain of *Fusarium oxysporum* Schl. The fungus was grown in Richards solution at pH 5, using 300 cc. for each culture in a 500 cc. Ehrlenmeyer flask. After 10 days the fungus had produced a heavy mat. Initially, and every 3rd day thereafter, the solution was removed from a culture, the pH determined and the filtrate, diluted with an equal amount of distilled H₂O placed in vials into which were placed the cut ends of freshly cut stems of potato (*Solanum tuberosum*), tomato (*Lycopersicum esculentum*) and celery (*Apium graveolens*). The check, cut potato stem placed in pure H₂O, wilted after 48 hours. The potato stem in the *Fusarium* culture medium wilted in 8 hours in the case of a culture 40 days old and in 42 hours for the 10-day-old culture. For the tomato the corresponding times were 8 and 24 hours, respectively, but for the 20- and 24-day-old cultures the time required was 36 hours. The celery wilted in 8 hours for the 20-day-old culture, 24 hours for the 24-day-old culture, and 12 hours for the 40-day-old culture. The pH of the culture solution changed toward the acid side until it reached 3.8 on the 10th day, then turned toward the alkaline side, reaching 5.2 the 24th day, and 7.4 the 40th day. The potato wilted more rapidly the older the culture, but the tomato and celery responded to the wilting least when the pH of the culture solution approached that of the plant juices, 4.8-5.6. An alkaloid was extracted from the culture fluid which when redissolved caused wilting, but much less rapidly. On the other hand, the alcoholic precipitate of the filtrate on being redissolved caused rapid wilting.—Ernst A. Bessey.

5252. ZOLLER, HARPER F., and SYLVIA M. EATON. **The phenol coefficient and relative disinfecting power of sodium hypochlorite.** [Abstract.] Absts. Bact. 7: 6-7. 1923.—The phenol coefficient ranges from 42.8 for *Bacillus tuberculosis* to 330. for *Proteus vulgaris*.—D. Reddick.

MISCELLANEOUS

5253. AYERS, S. HENRY, and COURTLAND S. MUDGE. **The streptococci of souring milk.** [Abstract.] Absts. Bact. 7: 11-12. 1923.—*Streptococcus kefir* predominates at first but as the acidity increases *S. lactis* supersedes it.—D. Reddick.

5254. BURKE, VICTOR, and MABEL ASHENFELTER. **A modification of the Gram stain for the differential staining of bacteria in milk.** [Abstract.] Absts. Bact. 7: 24-25. 1923.

5255. CLARK, WM. MANSFIELD. **Progress on oxidation-reduction indicators.** [Abstract.] Absts. Bact. 7: 2-3. 1923.—“The outstanding feature of the work is the establishment of accurate quantitative data where there has hitherto been guess work.”—From Author's Abstract.

5256. COHEN, BARNETT. **Some new sulfophthalein indicators.** [Abstract.] Abst. Bact. 7: 3. 1923.—The indicators and the pH range covered by each are as follows: Brom-chlor phenol blue, 3.2-4.8; brom cresol green, 4.0-5.6; meta cresol purple, 0.5-2.5 (red-yellow) and 7.6-9.2 (yellow-purple); chlor phenol red, 5.0-6.6; brom phenol red, 5.4-7.0.—The apparent dissociation constants at 20°C. have been determined, and redeterminations made for the Clark and Lubs series, and these are presented in tabular form.—D. Reddick.

5257. PRUCHA, M. J., and J. M. BRANNON. Persistence of *Bacterium typhosum* in ice cream. [Abstract.] Absts. Bact. 7: 8. 1923.—The organism was alive in small number at the end of 11 months and 15 days when stored at -4°F .—*D. Reddick*.

SOIL SCIENCE

A. G. McCall, *Editor*

(See also in this issue Entries 4723, 4728, 4731, 4733, 4734, 4735, 4737, 4738, 4744, 4745, 4748; 4753, 4754, 4786, 4796, 5003, 5012, 5023, 5026, 5181, 5203, 5207, 5208, 5229, 5230, 5240, 5246)

5258. BAUER, F. C. The foraging power of plants for rock phosphate. Jour. Amer. Soc. Agron. 15: 99-109. 1923.—A general discussion is presented. It is concluded that the laws of mass action and chemical equilibrium satisfactorily explain the foraging power of plants for phosphate rock.—*F. M. Schertz*.

5259. BURGESS, PAUL S. The reaction of soils in the field as influenced by the long-continued use of fertilizer chemicals. Rhode Island Agric. Exp. Sta. Bull. 189. 35 p. 1922.—The determinations of pH and "lime requirement" is regarded as a partial basis for correlation between the soil reaction and growth of crop plants. The commercial carriers of phosphorus tend to reduce soil acidity, organic nitrogen and sulphate of ammonia to increase it, and potassium slightly to reduce acidity.—*B. L. Hartwell*.

5260. CROCKER, WILLIAM. The necessity of sulphur carriers in artificial fertilizers. Jour. Amer. Soc. Agron. 15: 129-141. 1923.—The subject is discussed according to the following topics: function of sulphur in crops; sulphur and phosphorus content of soils, both absolute and as measured by crop removal; the increments in the soil content of sulphur from the atmosphere and the loss from the soil by leaching; effect of sulphur carriers upon crop yield. The formative effects of sulphur on legumes are manifested by an increased absorptive system, an increased nitrogen-fixing apparatus, and a modified carbohydrate mechanism.—*F. M. Schertz*.

5261. GAINNEY, P. L. The inoculation of soil with *Azotobacter*. [Abstract.] Absts. Bact. 7: 22. 1923.

5262. GIRARD, ANTOINE CHARLES. Les engrais, emploi raisonné et lucratif. [The proper and profitable use of fertilizers.] 163 p. Librairie agricole de la maison rustique: Paris, 1922[?].

5263. HASKELL, S. B. Methods of distribution of phosphorus fertilizers. Jour. Amer. Soc. Agron. 15: 141-152. 1923.—Superphosphate, carrying a low percentage of water-soluble substances, applied alone is comparatively safe in any reasonable application, almost without regard to the method of application. When superphosphate comes in contact with the seed it is much safer than a complete mixed fertilizer. The retarding effect of fertilizers on germination varies with the crop, the soil, and with moisture conditions. Under humid conditions a local application of fertilizer may be more beneficial and economical than broadcast distribution. On drier western [U. S. A.] soils, as the benefit from localized application becomes relatively less, the danger of overstimulation of the crop becomes relatively greater.—*F. M. Schertz*.

5264. HORNER, W. W. Rainfall and run-off studies in St. Louis. Sprinkling experiments at Washington University. Municipal and County Engineering 63: 176-180. 1922.—Beds experimented with are $\frac{1}{100}$ acre in area; measured quantities of water are applied by hose and sprinklers at various rates and the run-off information obtained by accurately measuring the water collected from the experimental area in sub-drains. The experiments, part of

which have been completed, are being conducted on the Washington University campus for (1) typical soil conditions on the campus; (2) bare soil and sod covering; (3) surface slopes of 10, 5, and 0.08 per cent. It was found that the relation between total rainfall and run-off for each experiment could be represented with a fair degree of accuracy by a straight line. From this line 2 factors developed, (1) the intercept of the line on the rainfall axis gives the amount of water in cubic feet necessary to produce a normal surface film, and (2) the slope of the line indicates the rate of absorption (and possibly evaporation) during the run. The figures for volume required to produce a surface film and volume lost by absorption were divided by the amount of water applied and the results taken to represent the percentage of rainfall required for the surface film and percentage lost through absorption; and they checked almost perfectly against experimental run-off figures.—*A. E. Gorman.*

5265. JOFFE, JACOB S. **Acid phosphate manufacture by a biological process.** [Abstract.] *Absts. Bact.* 7: 19. 1923.—If suitable conditions are supplied it is possible to secure acid phosphate in 18 weeks by means of the sulphur-oxidation process.—*D. Reddick.*

5266. LOVEJOY, P. S. **The effect of forest fires upon the soil of the northern lake states.** *Rept. Michigan Acad. Sci.* 22: 9-20. 1920.—Arguments and evidence are submitted controverting the statements of some investigators that forest fires are beneficial, or at least not harmful to the soil.—*Ernst A. Bessey.*

5267. OSUGI, S. **On the catalytic action of soils.** *Ber. Ohara Inst. Landw. Forsch.* 2: 197-218. 1922.—The catalytic action of soil, or the power of soil to decompose H_2O_2 with the liberation of O_2 , was found to vary with the physical condition of the soil particles. Any treatment which increases the quantity of colloidal substances in the soil lessens catalysis, while peptinization of the soil particles speeds up the reaction. An alkaline reaction accelerates catalysis, and an acid reaction retards it to some extent. This is due partly to change in the physical state of the soil particles and partly to the reaction itself. Experiments conducted to determine the effect of the chemical nature of soil on its catalytic activity has led the writer to believe that humus, manganese, and iron may be the main constituents which give the soil catalytic power, although he could not obtain any quantitative relation between soil activity and soil-content of these constituents. The effect of bacteria on soil catalysis is slight, but that of enzymes is very marked.—*Margaret Buvens.*

5268. POWERS, W. L. **Progress of sulphur investigations with Oregon soils.** *Jour. Amer. Soc. Agron.* 15: 158-160. 1923.—A review of the sulphur investigations at the Oregon Experiment Station is given.—*F. M. Schertz.*

5269. SCHREINER, OSWALD. **Organic phosphorus in soils.** *Jour. Amer. Soc. Agron.* 15: 117-124. 1923.—Proof is offered of the existence of organic phosphorus in soils by the isolation of at least 1 definite organic compound containing it, namely, nucleic acid. Lecithins, phytins, nucleic acids, nucleo-proteins, and other complex compounds contain phosphorus in an organic form. The decomposition of nucleo-proteins and nucleic acids is discussed and it is pointed out that nucleic acid has a decided growth-promoting property not equalled by that of the usual inorganic nitrates or phosphates.—*F. M. Schertz.*

5270. SHERWIN, M. E. **The effect of fertilizers on germination and seedling growth.** *Jour. Amer. Soc. Agron.* 15: 66-73. 1923.—Fertilizers generally inhibit germination. The inhibition is greater when the fertilizer is in direct contact with the seed than when it is mixed with the soil, and is generally proportional to the quantity of fertilizer used. It is greater with the more soluble mineral fertilizers than with the less soluble mineral or organic materials. Apparently the inhibiting action is not due to a direct effect of the fertilizers upon the viability of the seed, but to a retarding influence upon the osmotic absorption of water from the soil by the seed, in the case of the soluble mineral fertilizers. The presence of organic fertilizers stimulates the growth of fungi, which are injurious to the root system of

young seedlings. Borax in amounts as small as 3.5 pounds per acre exerts a marked inhibiting effect upon root growth.—*F. M. Schertz.*

5271. TRUOG, E. **Determining the phosphorus needs of soils.** Jour. Amer. Soc. Agron. 15: 110-117. 1923.—A less expensive and more rapid method is needed for determining the phosphorus requirement of soils in regions like Wisconsin, because of the great natural variation in the soils. A tentative table gives the minimum percentages of phosphorus deemed adequate for general farming in Wisconsin under different soil conditions.—*F. M. Schertz.*

5272. WAKSMAN, SELMAN A. **Methods in soil microbiology.** [Abstract.] Absts. Bact. 7: 18-19. 1923.

5273. WIEDMER, F. **Peat as a fertilizer ingredient.** Jour. Amer. Peat Soc. 16: 52-54. 1923.—Peat is useful as a base for fertilizers on account of its high absorbency and its deodorizing properties. Some peat contains "available" nitrogen, but this must be determined for each kind of peat.—*G. B. Rigg.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See in this issue Entries 4718, 4719, 4750, 4752, 4774, 4855, 4869, 4989, 5007, 5101, 5112, 5154, 5675, 5676)

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*

S. F. TRELEASE, *Assistant Editor*

5274. BALL, E. D. **Agricultural research as a career.** Science 57: 597-601. 1923.

5275. BEAUVERD, G. **L'herbier du Dr. Louis Bouvier à L'institut de Botanique.** [The herbarium of Dr. Louis Bouvier at the Botanical Institute.] Bull. Soc. Bot. Genève 13: 7. 1921.

5276. FUENTES, F. **Informe de la seccion de plantas fanerogames.** [Report of the section of phanerogamic plants.] Bol. Mus. Nacion. Santiago 11: 266-269. 1918/19 [1920].

5277. GAGER, C. STUART. **A proposal for wild flower conservation.** Science 57: 52-54. 1923.—In 1921 the Vermont legislature passed a general game law for plants, which places a list of rare plants under complete protection from commercial collections and restricted collection by botanists. The American Fern Journal for Sept., 1922, contains an article on the use of this method by other states [see Bot. Absts. 12, Entry 4706]; reprints are available for general distribution.—*C. J. Lyon.*

5278. HOLMAN, RICHARD. **Use of the carbon dioxide freezing attachment on the rotary microtome.** Science 57: 363-364. 1923.—The use of a CO₂ freezing attachment is possible if a flexible, thin-walled copper tube is used to deliver the gas to the freezing chamber.—*C. J. Lyon.*

5279. KELLOGG, VERNON. **National research fellowships in the biological sciences.** Science 57: 373-375. 1923.

5280. LIDDELL, MARK H. The endowment of scientific research. *Science* 57: 612-613. 1923.

5281. QUER, F. El Department de Botanica en 1918. [Report of the botanical department for 1918.] *Ann. Junta Cien Nat. [Barcelona]* 3: 137-142. 1918 [1921].

5282. RANSON, R. The Florida Everglades. *Jour. Amer. Peat Soc.* 16: 55-59. 1923.—Four million acres of the Everglades may be described as one immense peat bog, containing almost every known kind of peat.—*G. B. Rigg.*

5283. THARALDSEN, C. E. Furfural as a biological reagent. *Science* 57: 305-306. 1923.—Furfural is now made in commercial quantities from oat hulls. Its chemical properties resemble those of formaldehyde. It may be used as a preservative, a vehicle of stains, and a general solvent in micro-technique. As a preservative it is best used as a concentrated (8 per cent) aqueous solution; it does not harden or shrink tissues but it does impart a slight yellowish-brown tinge. It dissolves coal tar dyes, alcohol, xylene, balsam, parlodion, and other reagents.—*C. J. Lyon.*